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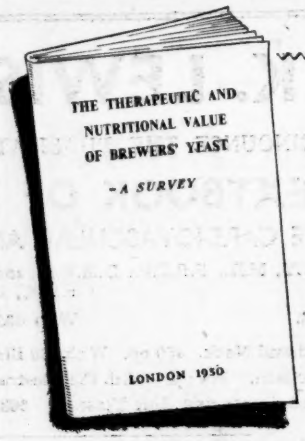

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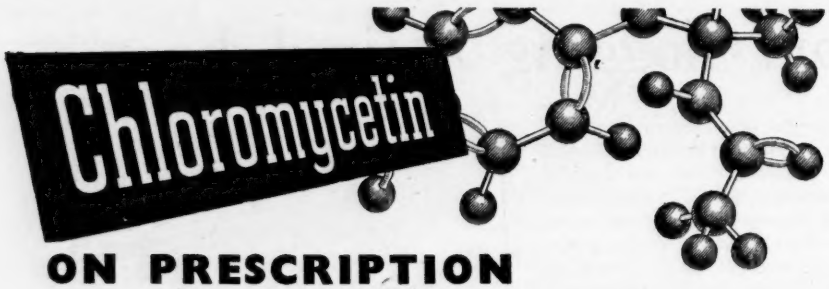

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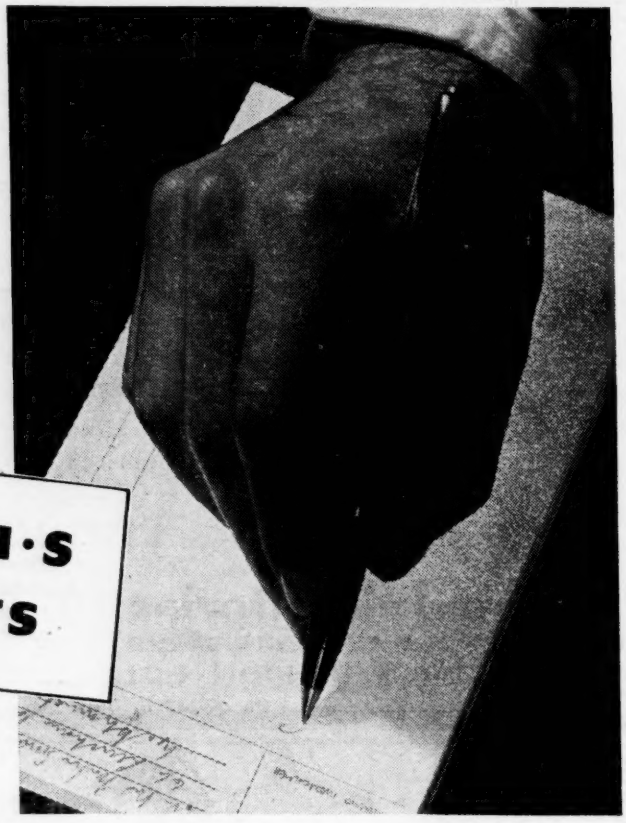

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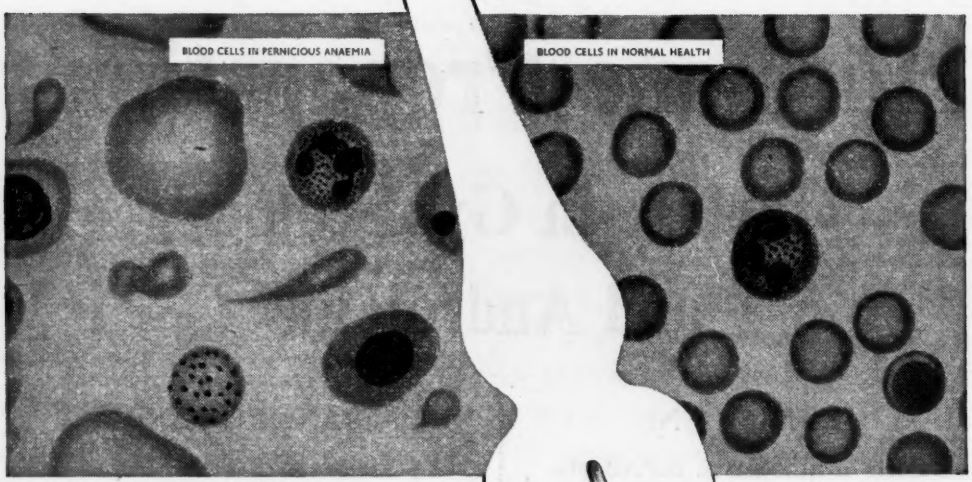

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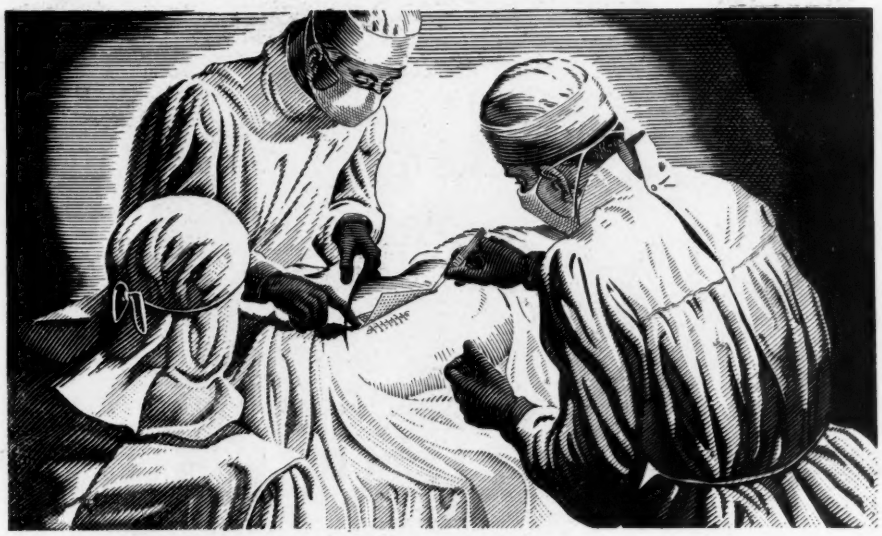

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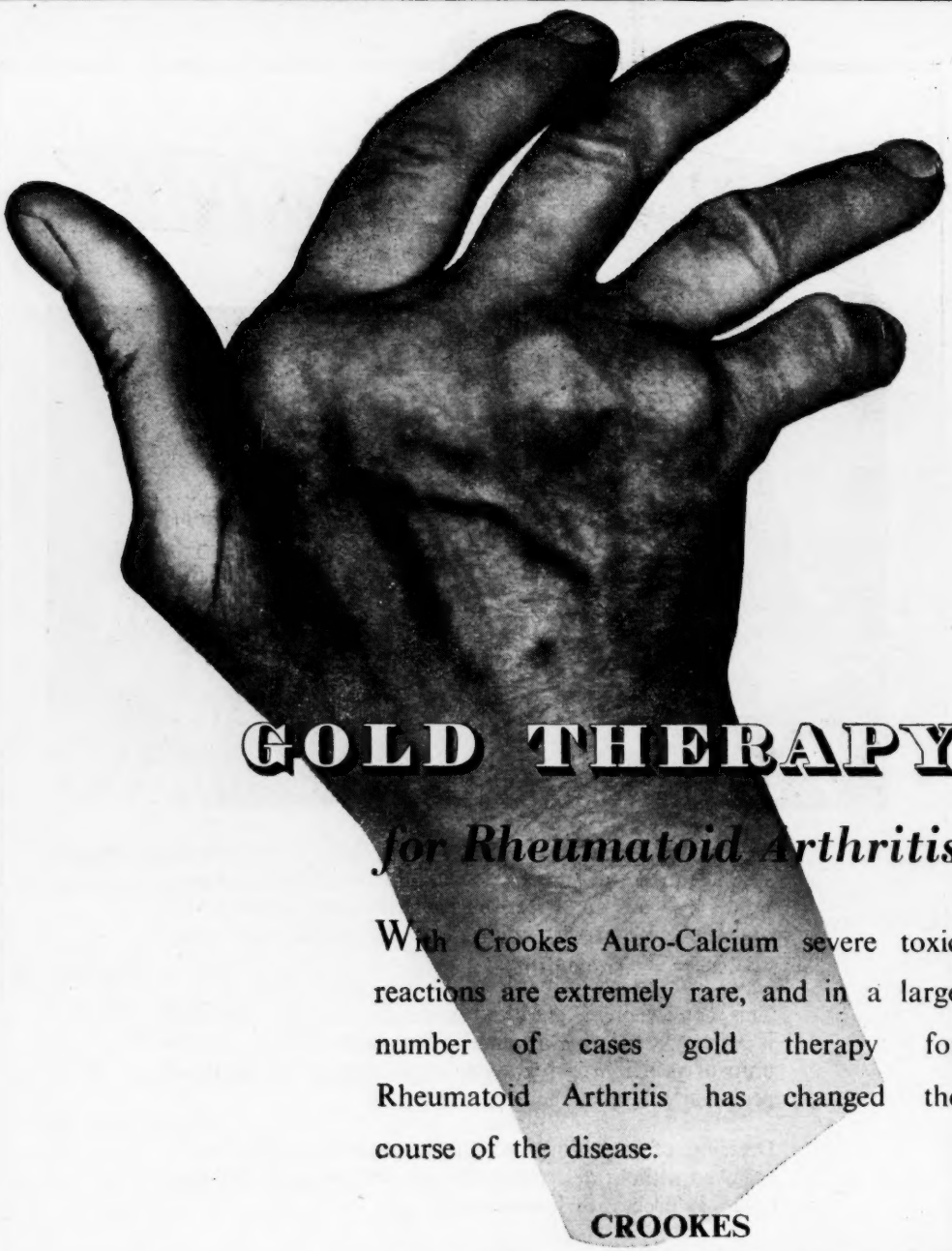

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ACUTE OBSTRUCTIVE LARYNGOTRACHEITIS AND LARYNGOTRACHEOBRONCHITIS

REPORT OF AN OUTBREAK

JOHN O. FORFAR
M.C., M.B., B.Sc. St. And., M.R.C.P., M.R.C.P.E., D.C.H.
LECTURER IN MEDICAL DISEASES OF CHILDREN IN THE UNIVERSITY OF ST. ANDREWS; PÆDIATRIC PHYSICIAN, MARYFIELD HOSPITAL, DUNDEE; ASSISTANT PÆDIATRIC PHYSICIAN, ROYAL INFIRMARY, DUNDEE

KENNETH R. KEAY
M.B. St. And., M.R.C.P.E.
PÆDIATRIC REGISTRAR, ROYAL INFIRMARY, DUNDEE

JAMES THOMSON
M.B. Edin., F.R.C.P.E.
LECTURER I.C. DEPARTMENT OF MEDICAL DISEASES OF CHILDREN, UNIVERSITY OF ST. ANDREWS; PÆDIATRIC PHYSICIAN, ROYAL INFIRMARY, DUNDEE

FEW reports on non-diphtheritic obstructive laryngotracheitis and laryngotracheobronchitis have appeared in this country, although during the past thirty years an extensive literature on the subject has grown up in America. A recent outbreak in Dundee therefore appears worthy of record.

There is considerable variation in terminology. Morgan and Wishart (1947), for instance, use the term acute laryngotracheobronchitis in a wide sense and include within it even cases of spasmodic croup, whereas Kayser (1941), Baum (1945), and others suggest that it should be used only for cases of such severity as to require instrumental relief of respiratory distress. The former interpretation seems to be too broad, and the latter too restricted and somewhat unsatisfactory in that such a potentially variable factor as a method of treatment is used in defining it. With others acute laryngotracheobronchitis implies the presence of tough viscid secretions throughout the respiratory tract (LeJeune and Bayon 1941). Anatomically we could use three terms: obstructive laryngitis, obstructive laryngotracheitis, and obstructive laryngotracheobronchitis. From a clinical point of view, however, the difficulty of differentiating in young children between obstructive laryngitis and obstructive laryngotracheitis, without laryngoscopy, leads us to use the one inclusive term, obstructive laryngotracheitis, where there is acute laryngeal inflammation associated with signs of persisting respiratory obstruction. In obstructive laryngitis, moreover, there is usually some inflammation of the trachea as well (MacCready 1944). We reserve the term obstructive laryngotracheobronchitis for these cases in which, in addition to acute obstructive laryngotracheitis, there is auscultatory or other evidence of bronchitis. Further, on the basis of clinical assessment we classify cases as mild, moderate, or severe.

THE OUTBREAK

All the cases reported were admitted to the children's wards of the two general hospitals in Dundee, a city of 182,000 inhabitants. Although these hospitals serve a regional population of 400,000, no case was admitted from outside the city. 22 cases diagnosed as acute obstructive laryngotracheitis or acute obstructive laryngotracheobronchitis occurred within the three months from August to November, 1949. The age-incidence was from four months to nine years, and the sex-incidence, 68% male and 32% female.

Acute laryngeal obstruction was present in all the cases reported, but they should be considered against a background of prevalent acute laryngitis and acute laryngotracheitis occurring in the same population at the same time, both in adults and in children, in whom signs of respiratory obstruction were absent or of insufficient severity to warrant admission to hospital. Frequently other members of the family were so affected or had been a few days previously. In adults the main complaint was of pharyngeal discomfort, the pharynx being slightly reddened and appearing granular. Many cases developed septic tonsillitis about the second day or later. Although sulphonamide eliminated the sepsis, pain was not relieved.

The accompanying table sets out the main findings and treatment in individual cases. In 13 of these acute obstructive laryngotracheitis was diagnosed, and in 9 acute obstructive laryngotracheobronchitis. 9 were graded as severe, 7 as moderate, and 6 as mild. The condition was not therefore invariably an acute and alarming emergency although it was always potentially so. It will be noted that the grade of severity does not necessarily correspond to the amount of respiratory tract involved.

CLINICAL PICTURE

In all cases respiratory distress was of sudden onset, and in no case had it been present for more than twenty-four hours before admission. One child was brought to the casualty department because his mother thought that something had stuck in his throat. In some cases the respiratory distress arose without previous symptoms. In others there had been a preceding period of a few days, and in 2 cases up to two weeks, in which coryza, a cough, or some slight hoarseness had been present. Sore throat and headache were complained of by a few of the older children. The onset of respiratory distress was generally associated with a croupy cough.

On admission the two outstanding features were respiratory distress and prostration. The children were struggling for breath; stridor, inspiratory and expiratory, was severe, and in many cases there was the restlessness, the constant changing of position, and the anxious facies associated with anoxia. Sleeplessness was pronounced. Suprasternal recession and indrawing of the intercostal spaces and epigastrium were usually present. Obvious cyanosis was not a feature, but, especially in the more severe cases, there was an ashen pallor, to which we learned to attach a grave significance, and which was not improved by tracheotomy. In addition to the respiratory distress there was a severe toxæmia leading to prostration and exhaustion out of proportion to the amount of asphyxia present. This was seen particularly in case 20, who died rapidly despite the fact that a free airway had been established early by tracheotomy and was proved at necropsy to have been present. The temperature and respirations varied from 98·4° to 104·6°F and from 28 per minute to 66 per minute respectively. Tachycardia was invariably present. Inspection of the throat revealed either no abnormality or moderate injection. A considerable amount of mucopus was occasionally present. Where laryngoscopy was performed it revealed inflammation and œdema of the larynx with or without mucopurulent exudate. No membrane was seen. In the first 3 moderate or severe cases this examination was made to ensure that no diphtheritic membrane was present in the larynx. On each occasion the respiratory distress and prostration were worse thereafter, so much so that we became reluctant to use this procedure, and it was only used once more (in case 20) during the outbreak. It was felt that with the occurrence of many similar cases the withholding of laryngoscopy was justified. We do not consider that in sporadic or in doubtful cases this would be so. Examination of the chest was often difficult because of the restlessness of the patient and the stridor. In some cases it revealed normal breath sounds, in others diminished air entry, bronchovesicular or bronchial breath sounds, rhonchi, or moist râles. The percussion note was usually resonant. Radio-

graphy showed normal lung fields, bronchitic change, or occasionally terminal bronchopneumonia. The white-cell count varied from 5000 to 33,000 per c.mm.; it bore no relationship to the severity or the duration of the illness.

Swabs were taken from the pharynx on or shortly after admission and later also from the site of the lesion when feasible. They revealed a variety of organisms, none of which seemed to predominate in this outbreak. *Corynebacterium diphtheriæ* was isolated from the larynx in case 1 in addition to Friedländer's bacillus, streptococci, and staphylococci; this was proved bacteriologically to be avirulent. The child had been previously immunised against diphtheria and had received diphtheria antitoxin without improvement; nor did tracheotomy relieve him. There was a profuse mucopurulent exudate in the larynx, trachea, and bronchi. We feel justified, in view of these findings and in view of the epidemic occurrence of non-diphtheritic respiratory obstruction at this time, in considering that this boy was a diphtheria carrier, and that diphtheria was not responsible for his acute obstructive laryngotracheobronchitis. Thomson (1922) has expressed the view that the carrier state may occasionally lead to *C. diphtheriæ* being isolated from cases of acute laryngotracheitis of non-diphtheritic ætiology. Neffson and Wishik (1934) found that in 8% of their cases of non-diphtheritic acute laryngotracheobronchitis *C. diphtheriæ* was cultured from the laryngeal swab. Diphtheria, incidentally, is now rare in this locality.

COURSE

The course was short. In the 4 patients who died the total duration of illness varied from ten hours to three days; in the patients who recovered, convalescence was established within a week.

TREATMENT

Treatment in the main consisted of humidification of the atmosphere and of the administration of oxygen and chemotherapeutic and antibiotic drugs, with attempted instrumental relief of respiratory obstruction in 3 cases. The atmosphere in a small side-room was humidified with an open steriliser, a relative humidity of 80% being achieved with a room-temperature of 75°–80°F. Increase in the temperature beyond this level only added to the patient's discomfort. Oxygen was supplied through an oxygen tent or on one occasion through a B.L.B. mask. The use of these devices had to be limited in certain cases to short periods only, because the patient tended to become very restless and intolerant of them, so much so that in these cases their continued use was likely to add considerably to the exhaustion already present. Adequate fluids were given and these were taken well, particularly by the younger children. The chemotherapeutic and antibiotic agents used and the dosage given are shown in the table. With severe cases later in the epidemic the dosage of penicillin was increased, and in addition 'Aureomycin' was given. Cases 12 and 13, both of whom were so severely ill that they did not seem likely to recover, did so on this régime. Following the report of Moncrieff and Weller (1949) we had the opportunity to use chloramphenicol in 2 cases, one moderate, the other mild. The former patient (case 17) recovered uneventfully, and the latter (case 21), a mongol, died of bronchopneumonia during convalescence from acute laryngotracheitis while still under treatment with chloramphenicol. Tracheotomy was done in cases 1 and 20. In case 1 it was done sixty-four hours after the onset of symptoms and was followed by intubation through the tracheotomy tube to suck out secretions. In case 20 it was done fourteen hours after the respiratory distress first began. In case 5 laryngeal intubation with attempted removal of secretions by suction was done seventeen hours after he became acutely ill. These 3 patients died.

NECROPSY FINDINGS

Necropsies were done on cases 1, 5, 20, and 21.

Macroscopically, inflammation and œdema of the larynx were the outstanding features. The inflammation extended to various degrees downwards to the trachea or the bronchi, and upwards into the epiglottis, pharynx, and tonsils. The larynx was partly or, in one case, almost completely occluded. Mucopurulent exudate was present in various amounts, in the pharynx only, or extending down the respiratory tract even to the bronchioles. In 2 cases areas of purulent necrotic membrane were present in the subglottic region and in the trachea. The lungs were involved to a greater or lesser degree, showing either areas of bronchopneumonic consolidation, patchy collapse, and compensatory emphysema, or little change beyond basal congestion. Other abnormalities, noted in some cases but not in others, were enlargement of the cervical and tracheobronchial lymph-nodes, pallor and flabbiness of the myocardium, and fatty change in the liver.

Histologically, there were œdema, hyperæmia, loss of epithelium, and cellular infiltration. These changes were maximal in the larynx but occurred also in the trachea, main bronchi, and epiglottis. Case 5 had gross necrosis and denudation of the laryngeal mucosa. The submucous glands showed catarrhal change only. The appearances in the lung indicated aspiration bronchopneumonia, with little interstitial inflammation. Where the heart was examined it showed interstitial œdema, without evidence of focal necrosis or of cellular infiltration.

ILLUSTRATIVE CASE-RECORDS

Case 3 (moderate).—A boy, aged 22 months. On the morning of the day of admission this boy had been noted to be hoarse. That evening his breathing had suddenly become laboured and noisy, and stridor had developed. He had refused all food. He was admitted to hospital four hours later.

On admission there was respiratory embarrassment with struggling noisy respiratory efforts and indrawing of the lower part of the chest. Stridor was severe, but cyanosis was not present. The respirations were 30 per minute. The fauces were injected, but no membrane was visible. There was uniform expansion of the chest, with a resonant percussion note. The breath sounds were diminished and partially obscured by the stridor. Radiography showed no abnormality in the lung fields. The white-cell count was 17,400 per c.mm., the pulse-rate 120, and the temperature 99°F.

Treatment and Progress.—The patient was kept in a steam-moistened atmosphere in an oxygen tent and given penicillin and sulphadimidine (see table). After twenty-four hours his stridor and respiratory distress were less and his temperature was settling. After forty-eight hours only hoarseness and occasional cough remained. A throat swab showed the presence of hæmolytic streptococci and was negative for *C. diphtheriæ*. The boy returned home symptom-free after nine days in hospital.

Case 5 (severe).—A boy, aged 7 years, had first complained of sore throat and malaise twenty-four hours before admission. He had gone to school the previous day, but that evening had become hoarse and had difficulty in breathing. Throughout the night dyspnœa had gradually increased. He had become cyanosed and vomited once or twice.

On admission next morning, fifteen hours after the onset of respiratory difficulty, he was extremely pale and appeared toxic. His expression was anxious, his intellect clear. He was struggling for breath, and although stridor and intercostal indrawing were present they were not extreme. His respirations were 45 per minute, temperature 102·4°F, and pulse-rate 174. His pharynx was injected and full of mucopurulent secretions.

Treatment and Progress.—The patient's colour improved a little after treatment with continuous oxygen through a B.L.B. mask and with 1 ml. of nikethamide intramuscularly. Two hours after admission, however, his condition was deteriorating. Laryngoscopy showed an inflamed œdematous larynx. The vocal cords were seen, and mucopurulent secretion was present. Tracheal intubation and aspiration produced no benefit. Breathing subsequently became weaker, and the boy became exhausted and apathetic and died six hours after

SUMMARY OF CASES

Case no.	Sex	Age	Duration of (a) symptoms, (b) respiratory distress before admission	Bacteriological findings	Diagnosis	Severity	Treatment	Duration of acute illness
1	M	Yr. mos. 1 3	(a) 8 hr. (b) ,,	Pharynx: *Staph. aureus*, Friedländer's bacillus. Larynx and bronchus: *Staph. aureus*, Friedländer's bacillus, *C. diphtheriæ* (var. *mitis*) (avirulent)	Laryngo-tracheo-bronchitis	Severe	Pen. 50,000 u. I.M. 8 hrly for 3 days S/dim. 2, 2, 1 g. q.q.h. for 3 days Ephedrine gr. 1/4 8-hrly for 3 days Diphth. antitox. 15,000 u. I.M. (Laryngoscopy) Tracheotomy	3 days Died*
2	M	5 0	(a) 24 hr. (b) ,,	Pharynx: Staphylococcus	Laryngo-tracheo-bronchitis	Moderate	S/dim. 1, 1, 0·5 g. q.q.h. for 7 days Ephedrine gr. 1/4 t.d.s. for 1 day Diphth. antitox. 20,000 u. I.M. (Laryngoscopy)	7 days
3	M	1 10	(a) 24 hr. (b) 4 hr.	Pharynx: Hæmolytic streptococcus	Laryngo-tracheitis	Moderate	Pen. 100,000 u. I.M. 8-hrly for 2 days S/dim. 2, 2, 1 g. q.q.h. for 5 days Diphth. antitox. 20,000 u. I.M.	3 days
4	F	3 0	(a) 4 hr. (b) ,,	Pharynx: Hæmolytic streptococcus	Laryngo-tracheitis	Mild	Pen. 100,000 u. I.M. 8-hrly for 6 days S/dim. 2, 2, 1 g. q.q.h. for 6 days	2 days
5	M	7 0	(a) 24 hr. (b) 15 hr.	Pharynx: *Staph. aureus*, *Strep. viridans* Blood: *Staph. aureus* Lung: *Staph. aureus*	Laryngo-tracheo-bronchitis	Severe	Pen. 250,000 u. I.M. Oxygen Nikethamide I.M. (Laryngoscopy)	30 hours Died*
6	M	2 4	(a) 36 hr. (b) 26 hr.	Pharynx: Hæmolytic streptococcus	Laryngo-tracheitis	Moderate	Pen. 200,000 u. I.M. q.q.h. for 7 days S/dim. 2, 2, 1 g. q.q.h. for 6 days S/thiaz. 0·5 g. q.q.h. for 6 days	4 days
7	F	1 3	(a) 4 hr. (b) ,,	Pharynx: *Staph. albus*, hæmolytic streptococcus	Laryngo-tracheitis	Mild	Pen. 250,000 u. I.M., then 100,000 u. I.M. q.q.h. for 4 days	3 days
8	F	3 0	(a) 10 hr. (b) 8 hr.	Pharynx: *Staph. aureus*, *Staph. albus*	Laryngo-tracheo-bronchitis	Severe	S/dim. 2, 2, 1 g. q.q.h. for 4 days ..	10 hours (admitted moribund) Died
9	F	2 2	(a) 14 hr. (b) ,,	Pharynx: Staphylococci and streptococci	Laryngo-tracheo-bronchitis	Severe	Pen. 250,000 u. I.M. twice S/dim. 1, 0·5 g. q.q.h. for 5 days Ephedrine gr. 1/4 q.q.h. for 5 days	3 days
10	F	2 6	(a) 12 hr. (b) 4 hr.	Pharynx: *Staph. aureus*, *Strep. viridans*	Laryngo-tracheitis	Mild	Pen. 1,000,000 u. then 250,000 u. I.M. 8-hrly for 5 days S/dim. 2, 2, 1 g. q.q.h. for 5 days S/thiaz. 0·5 g. q.q.h. for 5 days	3 days
11	F	0 8	(a) 24 hr. (b) ,,	Pharynx: *Staph. albus*, *Strep. viridans*	Laryngo-tracheitis	Mild	Pen. 1,000,000 u. then 250,000 u. I.M. 8-hrly for 5 days S/dim. 1, 1, 0·5 g. q.q.h. for 5 days	3 days
12	M	2 0	(a) 12 hr. (b) 2 hr.	Pharynx: no growth	Laryngo-tracheo-bronchitis	Severe	Pen. 1,000,000 u. then 250,000 u. I.M. 8-hrly for 5 days S/dim. 2 g. once S/thiaz. 1, 0·5 g. q.q.h. for 4 days S/thiaz. sol. I.M. 1 g. q.q.h. for 2 days Aureomycin 125 mg. 6-hrly for 3 days Ca. gluconate 10% 10 ml. I.M. once	3 days
13	M	1 4	(a) 24 hr. (b) 2 hr.	..	Laryngo-tracheitis	Severe	Pen. 1,000,000 u. then 200,000 u. I.M. 8-hrly for 4 days S/thiaz. sol. I.M. 1 g. q.q.h. for 3 days S/thiaz. 1 g. q.q.h. for 4 days Aureomycin 125 mg. 6-hrly for 1 day	4 days
14	M	0 10	(a) 12 hr. (b) 2 hr.	Pharynx: *Staph. aureus*, *Strep. viridans*	Laryngo-tracheitis	Severe	Pen. 1,000,000 u. then 200,000 u. I.M. 8-hrly. for 3 days S/thiaz. sol. I.M. 1 g. q.q.h. for 6 days S/dim. 0·5 g. q.q.h. for 6 days Aureomycin 125 mg. 6-hrly for 5 days	5 days
15	M	2 6	(a) 24 hr. (b) 12 hr.	Pharynx: *Strep. viridans*	Laryngo-tracheo-bronchitis	Moderate	Pen. 100,000 u. then 50,000 u. I.M. q.q.h. for 5 days S/dim. 1, 1, 0·5 g. q.q.h. for 5 days Ephedrine gr. 1/4 q.q.h. for 5 days	4 days
16	M	0 8	(a) 72 hr. (b) 24 hr.	Pharynx: *Strep. viridans*	Laryngo-tracheitis	Severe	Pen. 1,000,000 u. then 200,000 u. I.M. 8-hrly for 7 days S/dim. 1, 1, 0·5 g. q.q.h. for 3 days S/thiaz. 1 g. q.q.h. for 4 days Aureomycin 125 mg. 6-hrly for 5 days	6 days
17	M	0 4	(a) 24 hr. (b) ,,	Pharynx: no growth	Laryngo-tracheo-bronchitis	Moderate	Chloramphenicol 125 mg. 6-hrly for 5 days	6 days
18	F	0 7	(a) 24 hr. (b) ,,	Pharynx: *Staph. aureus*	Laryngo-tracheitis	Mild	Pen. 1,000,000 u. then 100,000 u. I.M. 8-hrly for 4 days S/dim. 1, 1, 0·5 g. q.q.h. for 5 days Aureomycin 125 mg. 6-hrly for 2 days	2 days
19	M	2 0	(a) 12 hr. (b) ,,	Pharynx: no growth	Laryngo-tracheo-bronchitis	Moderate	Pen. 100,000 u. then 50,000 u. I.M. q.q.h. for 8 days S/dim. 1, 0·5 g. q.q.h. for 8 days	5 days
20	M	2 6	(a) 24 hr. (b) 12 hr.	Trachea: Staphylococcus, non-hæmolytic streptococcus, *H. influenzæ* Pharynx (p.m.): *H. influenzæ*	Laryngo-tracheitis	Severe	Pen. 1,000,000 u. I.M. once Oxygen Tracheotomy Nikethamide I.M.	1 day Died*
21	M	18 weeks	(a) 5 days (b) 16 hr.	Pharynx: No growth	Laryngo-tracheitis	Mild	Pen. 1,000,000 u. then 50,000 u. I.M. 8-hrly for 5 days S/dim. 1, 1, 0·5 g. q.q.h. for 5 days Chloramphenicol 125 mg. 6-hrly for 1 day, then 250 mg. 8-hrly for 3 days	2 days Died* of broncho-pneumonia during convalescence
22	M	9 0	(a) 6 hr. (b) 4 hr.	Pharynx: no growth	Laryngo-tracheitis	Moderate	Pen. 1,000,000 u. then 200,000 u. I.M. 8-hrly for 4 days S/dim. 2, 2, 1 g. q.q.h. for 4 days Aureomycin 250 mg. 6-hrly for 2 days	4 days

* Necropsy. Pen., Penicillin. S/dim., Sulphadimidine ('Sulphamezathine') S/thiaz., Sulphathiazole.
S/thiaz. sol., Sulphathiazole soluble. All drugs given by mouth unless otherwise indicated.

admission. A laryngeal swab yielded a growth of *Staph. aureus*, which further investigation showed to be resistant to penicillin and to streptomycin in concentrations attainable therapeutically in the blood and to sulphanilamide, sulphapyridine, sulphadiazine, sulphathiazole, sulphadimidine, and sulphacetamide.

Necropsy (Dr. H. B. Goodall) showed an intensely inflamed œdematous larynx partially covered by a cream-coloured necrotic membrane. The trachea, particularly at the upper end, was involved in a similar inflammation; it contained thick tenacious mucopurulent exudate which extended into the bronchi. The larger bronchi were acutely inflamed, and the intermediate ones showed a few areas of catarrh. The lungs were the seat of widespread bronchopneumonic change, especially in the posterior parts of the lower lobes. Patches of collapse and of compensatory emphysema were a feature. The tracheobronchial lymph-nodes were enlarged and inflamed. The heart showed terminal engorgement of the right chambers. *Staph. aureus* was also isolated from the heart blood and from the lung in pure culture.

Histologically the larynx showed œdema and hyperæmia. The mucosa was almost completely necrosed, and there were areas of purulent infiltration into the submucosa, with catarrhal changes in the submucosal glands. Even the intrinsic muscles showed dense purulent infiltration. The trachea and main bronchi showed changes similar to those seen in the larynx, but less severe. Some of the bronchioles were blocked with pus. The inflammation in their walls, however, was not sufficiently developed to have caused this degree of purulent exudation, indicating that pus had been aspirated from the upper respiratory tract.

Case 12 (severe).—A boy, aged 2 years, had had a slight cough for two days before the sudden onset of severe respiratory distress at 9 P.M.

On admission two hours later dyspnœa was extreme. The respirations were 48 a minute. There was obvious indrawing of the suprasternal notch and of the lower anterior half of the chest. Breathing was noisy and harsh, with much inspiratory stridor. The facies was anxious, and the skin ashen pale. The child was restless and, although exhausted, could not sleep. His entire energy was concentrated on the effort of respiration, and he seemed oblivious of his surroundings and of those attending him. He appeared to be in extremis. The fauces were injected, but there was no membrane. The expansion of the chest was poor and equal on both sides, with a resonant percussion note and bronchovesicular breath sounds. There were scattered coarse crepitations over both lungs. Physical examination was otherwise negative. The boy's temperature was 100·8°F, pulse-rate 150, and white-cell count 17,900 per c.mm.

Treatment and Progress.—Continuous oxygen was given in an oxygen tent, and the room atmosphere was moistened with steam. Penicillin, sulphadimidine, sulphathiazole, and aureomycin were given as indicated in the table. The boy's condition remained unchanged throughout the first twenty-four hours. During the next twenty-four hours some improvement was manifest, although he was still critically ill. Thereafter improvement was rapid, with disappearance of all signs of respiratory distress by the fourth day. A throat swab taken shortly after admission, but after drug therapy had been started, revealed no bacterial growth. Radiography five days after admission showed normal lung fields. The patient was discharged home well after seven days in hospital.

DISCUSSION

The fact that obstructive laryngotracheitis and laryngotracheobronchitis tend to occur in epidemic form and in association with a high incidence of infection of the upper respiratory tract in the general population has been noted by many workers (Baum 1928, Kayser 1941, Loza 1941, Crooks 1947), and specific epidemics have been described by Smith (1936) and Jeffrey (1945). Gittins (1942), however, states that in twenty-two years' experience of acute laryngotracheobronchitis, he has never seen it in epidemic form. We have not been able to find any published report of a previous outbreak in Britain.

Ætiology

The view has recently gained ground that acute laryngotracheobronchitis is due to a virus, and that secondary invaders follow this (Morgan and Wishart 1947, Neffson 1949). The virus responsible for the acute laryngotracheobronchitis of fowls has been grown when inoculated into the amniotic sac of the chick embryo (Burnet and Foley 1941). When cultured in this manner the virus does not behave in the same way as the influenza virus, which has been suggested as the ætiological agent in human acute laryngotracheobronchitis because of the frequent association of epidemic influenza and this disease. Arden and Duhig (1944) suggest that the pathological changes are more in keeping with viral than with bacterial infection. Earlier reports favoured particularly the streptococcus as the ætiological agent (Jackson and Jackson 1936), although the disease has been attributed to the staphylococcus (Neffson 1942), *Hæmophilus influenzæ* (Sinclair 1941, De Navasquez 1942, Alexander et al. 1942), and other organisms (Neffson 1944). In the 10 cases described by Sinclair (1941), in which *H. influenzæ* was isolated from the blood in every instance and from the pharynx in 8 out of the 9 occasions on which a pharyngeal swab was taken, the clinical features and course were very similar to those of this outbreak. In our cases the absence of any predominating organism and the short course suggest that a virus was the cause, and the organisms isolated seem likely to have been secondary invaders, which were controlled in most instances by chemotherapy and antibiotic therapy. It is noteworthy that in case 5, where *Staph. aureus* was cultured from the throat, larynx, pneumonic lung, and blood, this organism was resistant to all the drugs used. It will be observed that throat swabs occasionally yielded no growth.

Incidence

In this country cases of obstructive laryngitis and laryngotracheobronchitis have been reported by De Navasquez (1942), Thomson (1949), Moncrieff and Weller (1949) and Garson (1950), but they seem to be not so infrequent as the paucity of these reports suggests. Age seems to be a predisposing factor to the severer forms, related no doubt to the small size of the infant larynx and to the readily yielding nature of its tissues. The age-incidence of the cases reported here follows closely that noted by others (Baum 1928, Smith 1936), as does the sex-incidence in its preponderance of males (Bradford and Leahy 1930, Neffson and Wishik 1934, Smith 1936, Bonham-Carter 1949).

Clinical Features

The mode of onset and course over the first 24–48 hours were similar to those of many of the American reports. A feature of this outbreak, however, was the occurrence in the cases who survived of what almost amounted to a crisis within 24–72 hours, followed by a rapid abatement of symptoms. Another feature was the relative absence of complications. The combination of these two features made the course of the illness short. In many of the reported cases of acute laryngotracheobronchitis, however, the duration of the illness has been measured in weeks. Perhaps the specificity of the infecting agent in this outbreak was responsible for the short course, or perhaps chemotherapy modified the primary agent or as already suggested, controlled secondary invaders. The patients who died seemed to do so as much or more from an overwhelming toxæmia as from the asphyxiation associated with respiratory obstruction with its attendant restlessness and exhaustion. Saphir (1945) attributes the sudden death in these cases to acute toxic myocarditis and has produced supporting histological evidence.

Diagnosis

The sudden onset, the characteristic symptoms, the pyrexia, and the epidemic occurrence made diagnosis of little difficulty in these cases. Diphtheria, obstructive laryngitis associated with the exanthemata, laryngitis stridulosa, retropharyngeal abscess, and the possibility of a foreign body in the larynx had to be considered.

Jackson and Jackson (1936) state that fulminating acute laryngotracheobronchitis with rapid death may simulate acute bronchopneumonia. Neffson (1949) has pointed out that in laryngeal diphtheria the sequence of symptoms tends to be cough, hoarseness, and dyspnœa, whereas in non-diphtheritic acute laryngotracheobronchitis it tends to be cough, dyspnœa, and hoarseness. The same worker believes that laryngoscopy should be done in every case. In 8 of our 22 cases a history of hoarseness preceding or accompanying the onset of respiratory distress was given. Like Jackson (1938) we found that a feature of most of our cases was persisting hoarseness after the respiratory distress had gone.

Treatment

The development of sudden and severe respiratory distress in a child who has appeared perfectly well a few hours previously presented an urgent and obvious therapeutic problem. Owing to the lack of agreement on what constitutes acute obstructive laryngotracheitis and laryngotracheobronchitis, and to the variation of severity in different outbreaks, no close comparison of percentage mortality figures and methods of treatment between one series of cases and another would be valid. Different methods of treatment are therefore difficult to compare. On certain measures, however, there is general agreement: the necessity for a high humidity of the respired air to prevent the secretions from drying and becoming viscid and crusted; the use of oxygen; the giving of adequate fluid; and the contra-indication to atropine and to sedatives which are respiratory depressants. Regarding humidity Davison (1940) has described the use of a mechanical humidifier rather than the use of steam. Brenneman et al. (1938) attribute an improvement in their mortality figures after 1935 to the fact that from that date the services of a skilled bronchoscopist were available. They advocate tracheotomy in all cases in which it is warranted by the severity of the illness as judged by the general condition of the patient and the findings on laryngoscopy and bronchoscopy. Most workers agree that tracheotomy is the most effective method of relieving respiratory distress, either alone or combined with intubation and suction through a tracheotomy tube, or bronchoscopic suction through the tracheotomy wound, to remove tracheal and bronchial secretions. Baum (1945) and Neffson (1942), however, favour intubation through the larynx as the method of choice in the first instance, reserving tracheotomy for cases in which this fails. Baum (1928) believes that tracheotomy may act adversely by causing drying and viscidity of secretions. McEntee (1949), commenting on early tracheotomy, states "Delay will save some tracheotomies and avoid some deaths." We have already referred to the fact that in our cases laryngoscopy, where this was done, was followed by an increase in the respiratory distress, and we have also noted that the two cases where tracheotomy was done and the one case where laryngeal intubation was done were not improved thereby. This failure to respond as expected to tracheotomy is in accord with the experience of Sinclair (1941). In most of our cases we relied mainly on the supporting measures already mentioned, combined with chemotherapy and antibiotics. This entailed 24–48 hours of anxious conservatism, but we feel that the results justified this course. Certainly some of the patients who recovered on conservative treatment appeared to be as severely ill as those who died and on whom instrumental relief of respiratory distress was attempted. Rebatta and Martin (1948) state that the introduction of penicillin and sulphonamides has rendered the avoidance of tracheotomy possible in many cases where previously it would have been done. Garson (1950) has used streptomycin successfully in one case and aureomycin with similar success in another. Of the 5 severe non-fatal cases in our series it will be noted that one patient received penicillin plus sulphonamide and the others received those drugs with aureomycin in addition. Published reports show considerable divergence of view about the value of sulphonamides and penicillin in this condition. The differences in type and in drug sensitivity of the organisms found has to be borne in mind, however. Be they primary agents or secondary invaders, they play an important rôle in the disease, and wide variability in the effect of sulphonamides and of penicillin could only be expected. The newer antibiotics aureomycin and chloramphenicol with their wide range of activity seem promising weapons requiring further assessment. However, in view of our ignorance about the true ætiology of acute laryngotracheobronchitis, and in view of the rapidity with which the condition may prove fatal, a combination of chemotherapeutic and antibiotic drugs seems to offer, for the present at least, a moderately effective if empirical line of treatment.

Mortality

The over-all mortality in this series was 18%, the mortality among cases classified as severe being 44%.

Pathology

The pathological appearances were similar to those usually described in this condition. Only 1 of our cases (case 20) was shown at necropsy to have almost complete occlusion of the larynx, and in this case an early tracheotomy had been done. In the others there was a reduced laryngeal lumen, which still, however, showed considerable patency. There was also evidence of toxic effects on the liver and myocardium. These facts seem to emphasise that, although laryngeal obstruction was an important factor, toxic effects were equally so. Regarding the nature of the laryngeal obstruction Brenneman et al. (1938) and others have laid particular emphasis on the importance of œdema of the loose subglottic tissue. Neffson (1949) has drawn a clinical distinction between cases in which this occurs and those, less frequent, in which supraglottic œdema is the main pathological finding. The formation throughout the respiratory tract of a membrane consisting of mucopus, desquamated epithelial cells, necrotic mucosa, and later fibrin, is not uncommon (Neffson 1949).

SUMMARY

An outbreak of 22 cases of acute obstructive laryngotracheitis and laryngotracheobronchitis is described.

This seems to be the first outbreak of this kind reported in Britain.

The epidemiology, ætiology, clinical features, pathology, and treatment are discussed.

Chemotherapeutic and antibiotic drugs may, in many cases at least, supplant the surgical measures which have in the past been considered essential in treatment.

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ORTHOPÆDIC SIGNS IN THE DIAGNOSIS OF DISC PROTRUSION

WITH SPECIAL REFERENCE TO THE STRAIGHT-LEG-RAISING TEST

JOHN CHARNLEY
B.Sc., M.B. Manc., F.R.C.S.

ASSISTANT ORTHOPÆDIC SURGEON, MANCHESTER ROYAL INFIRMARY; LECTURER IN ORTHOPÆDICS, UNIVERSITY OF MANCHESTER

FROM a practical point of view it is possible to distinguish two clinical types of sciatica: (1) cases with severe disability, in which the sciatic pain is accompanied by deformity and limited mobility; and (2) cases with only moderate disability, in which mobility is limited only slightly and there is no deformity.

In the first type a protruded disc can be diagnosed with certainty by simple clinical tests alone, and the diagnosis can be confirmed by operative findings. In the second type a firm diagnosis often cannot be made even with the aid of elaborate radiological techniques, and, even if a protruded disc is found at operation, the result of removal may not show that this was the sole cause of the symptoms.

It is an irony of fate that in the first type, where an unequivocal protrusion can almost always be demonstrated, with a nerve-root stretched tightly over it, the signs of root pressure are often absent, and even if present are immaterial to the diagnosis; while in the second type, where neurological signs are often the main factor in establishing the diagnosis, surgical exploration of the affected roots often gives disappointing results.

The investigation reported here was made to decide to what extent the various signs of deformity and limited mobility might be related to each other.

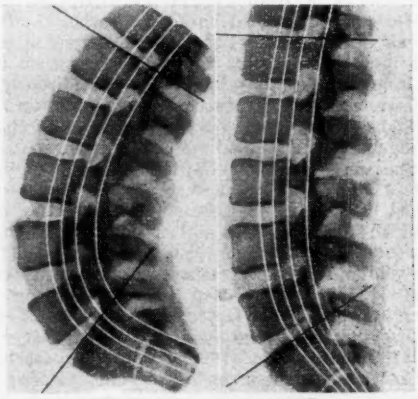
AXIS OF FLEXION AND EXTENSION OF SPINE

Without knowledge of the axis of movement between each pair of vertebral bodies it is impossible to predict the condition of the spinal theca and extradural nerve-roots during flexion and extension of the spine. When the spine moves from the flexed to the extended position, the space between the vertebral bodies enlarges anteriorly, and that between the spinous processes diminishes posteriorly. Though it seems fairly obvious that the axis of movement between each pair of vertebræ must lie near the spinal canal and in the posterior part of the disc, the researches of anatomists have not yet been promulgated in such a way as to convince the practising surgeon that the site of the axis has been conclusively settled; indeed from some reports—e.g., Wiles (1935)—it might be concluded that no fixed axis exists, and that the centre of movement changes position in the flexed and extended positions. Fick (cited by Steindler 1935), Poirier and Charpy (1926), and Quain (1915) evade direct mention of this point in the course of elaborate descriptions of the mechanics of spinal movement.

In investigating the movement of the lumbar spine, with special reference to the movement of the associated dura and extradural roots, the essential feature is not so much the location of an axis of movement *between each pair* of vertebral bodies, if such movement does indeed occur at an axis, but rather the determination of what might be called the "bending axis" for the spine as a whole; this is a longitudinal axis which experiences the minimal change in length during transition between the extreme positions of flexion and extension.

In the light of this conception of the "bending axis," a new attack was made on the problem by a method which is described here in detail because of its extreme simplicity. The procedure is to determine the linear distance between corresponding points on all the vertebræ, measured on X-ray films of the spine taken in flexion and in extension. Those points situated at a distance from the "bending axis" will either separate from or approximate to each other as the spine moves from flexion to extension, and vice versa; those points which neither separate from nor approximate to each other will therefore lie on the "bending axis" (fig. 1).

Method.—A fresh lumbar spine was removed from a cadaver, and lateral radiographs were obtained in positions of extreme flexion and extension at a 6-ft. tube distance to minimise distortion of measurements. To increase the clarity of definition the lumbar spine was bisected in the sagittal plane, only the right or left half being used, with the flat surface laid on the film. This bisection did not seem to alter the behaviour of the spine in flexion and extension as compared with the intact specimen. The two dry films so obtained, one in flexion and one in extension, were next cut to give curved strips in the following manner: to start the first strip, the scissors were carried through corresponding points along the anterior surfaces of the vertebral bodies; the second cut was made by passing through corresponding points in the substance of the vertebral bodies, midway between the front and back surfaces; the third cut passed through corresponding points at the junction of the anterior three-quarters with the posterior quarter of the bodies; the fourth cut passed through the posterior surfaces of the vertebral bodies; and the fifth, and last, cut was made through the estimated position of the posterior wall of the spinal canal. This produced two series of curved strips of film, one series taken in flexion and the other in extension, there being five strips in each series. It was now possible to compare, quite accurately, the exact



A B

Fig. 1—Bending axis of spine. A cadaveric spine is radiographed in extension (A) and flexion (B), and lines are drawn through corresponding points in the vertebræ. The variation in length of these curved lines can be compared in the extended and the flexed positions. Those lines which show the greatest variation in length lie furthest from the bending axis, whereas those which vary least lie nearest to the axis. In this specimen the axis of flexion lies about 5 mm. anterior to the posterior surfaces of the vertebral bodies.

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lengths of the convex edges by rolling them against the edge of a ruler; in this way two measurements were obtained for each curve, and the difference in lengths of the same curve in flexion and extension was thereby ascertained. The following figures were obtained from a very mobile spine in a person aged 18 and represent maximal figures:

Difference in lengths, over five lumbar vertebræ, of longitudinal parallels passing from flexion to extension

Anterior surfaces of the vertebral bodies increased 12 mm.
Mid-points of the vertebral bodies increased 3·5 mm.
Posterior quarter of the bodies increased 1 mm.
Posterior surfaces of the bodies decreased 5 mm.
Posterior limit of spinal canal decreased 11 mm.

From these figures it is seen that movement was least on a line passing somewhere through the posterior quarter of each intervertebral disc; and therefore this line is to be regarded as the "bending axis" of the spine. It will be found from measurements on a vertebra that the bending axis lies about 5 mm. anterior to the front surface of the spinal theca.

EFFECTS OF FLEXION AND EXTENSION ON SPINAL DURA AND NERVE-ROOTS

Attempts to measure relative movement between the dura and spinal canal in the lumbar spine by *direct* observation on the cadaver are unsatisfactory because of the depths of the wound, the difficulty of moving the spine as a result of rigor mortis and body-weight, and the small extent of the movements to be expected. And, even if these mechanical difficulties could be overcome, such observations would still only concern movement between the dorsal surface of the lumbar theca and the laminæ of the canal. The spinal roots emerge from the dura in an anterolateral direction and can be observed only with difficulty in the depths of the canal. The plane of the roots lies nearer the posterior surface of the bodies of the vertebræ than the dorsal aspect of the theca, and is thus nearer the bending axis of the spine. In the maximal figures obtained in the case described above there was a change in length, between flexion and extension, of 5 mm. over the whole length of five lumbar vertebræ measured on the anterior aspect of the theca, whereas corresponding movement measured over the posterior wall of the spinal canal was 11 mm.

This difference in mobility of the anterior and posterior surfaces of the lumber theca is reflected in the different anatomical arrangements of these two membranes. Being an inelastic membrane, the dorsal dura is lax and relatively redundant, whereas the ventral dura is closely applied to the posterior surfaces of the vertebral bodies without the intervention of any fatty areolar tissue and is rendered immobile by the nerve-roots which O'Connell (1943) aptly describes as "guy ropes which hold the anterior dura against the vertebral bodies."

If the anterior dura is inelastic, as there is every reason to believe, one might wonder how in the lumbar spine it accommodates itself to a change in length of 5 mm. between extreme flexion and extension. Two possibilities exist: either this 5 mm. is equally distributed over the whole length of the five lumbar vertebræ, in which case each extradural root has only to accommodate itself to 1 mm. of movement in relation to the adjacent bone (in a maximal estimation made on a youthful spine); or, the dura being fixed in the upper reaches of the spine, the range of movement between dura and bony canal becomes cumulatively greater as the distal end of the theca is reached. This second possibility is highly unlikely, both on theoretical and anatomical grounds, because this amount of movement would be detectable on gross examination in the cadaver. My own observations support the idea that the theca and extradural roots only experience local changes in length corresponding to the adjacent segment of the spinal canal; this behaviour of the theca is therefore quite different from that of the spinal cord and the nerves of the cauda equina, which, as is well known, move a considerable distance in relation to the bony canal during flexion and extension of the spine, and this relative movement becomes cumulatively greater in passing from the foramen magnum to the conus, hence the laxity of the cauda equina.

With the theca and nerve-roots inelastic, it seems a logical deduction that in the normal spine the total length of dura must equal the length of the anterior surface of the spinal canal when the whole spine is in full flexion; if this is so, all ordinary movements of the spine will take place with a relaxed dura; there is no reason to suppose that the normal dura is ever stretched beyond its maximal length. The calculations already mentioned show that the linear changes experienced by the anterior surface of the spinal theca, even for extreme movements, are remarkably small (being near the bending axis). *This therefore explains why a protruded disc can produce more local stretching of the adjacent dura and nerve-root than can the local stretch resulting from normal movement between the extreme positions of flexion and extension.*

REVERSED LUMBAR LORDOSIS

It is well known that in a severe case of disc protrusion the normal lumbar lordosis is often obliterated, and may even be replaced by a lumbar kyphosis. The reasons for this obliteration of the normal hollowing of the lumbar spine offer a most interesting field for speculation.

If sciatic pain is caused by *stretching* of the extradural portion of the nerve-root (O'Connell 1943) rather than by simple *compression*, a lumbar kyphosis will increase the pain by increasing the tension on the dura. One would have expected from the preceding mechanical analysis that the natural protective reaction to stretching of the dura would be to increase the lordosis rather than to abolish it.

O'Connell (1943) has attempted to explain reversed lumbar lordosis as a mechanism for relaxing tension in the sciatic nerve and extradural roots in the following words (p. 243):

> "If a normal individual is asked to obliterate his normal lumbar lordosis . . . it will be seen that what takes place is a tilting upward of the anterior portion of the bony pelvis with a depression of the sacrum so that the upper portion of the trunk is lowered relatively to the fixed lower limbs. Such a movement would have the effect of producing relative relaxation in the roots of the sciatic nerve—the opposite effect to that which follows flexion of the hip or spine."

To the orthopædic surgeon this explanation is untenable. In the standing position it is impossible for the normal adult to flatten the lumbar lordosis by backward rotation of the pelvis on the hips, *without at the same*

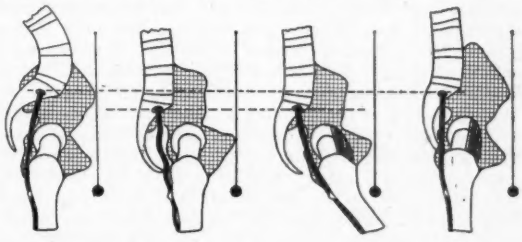

Fig. 2—A, normal standing position, showing pelvis, hip-joints, and sciatic nerve in relation to a vertical plumb-line. B, O'Connell's explanation of flattening of the lumbar spine; in this theory backward rotation of the pelvis is stated to relax the sciatic nerve. C shows the impossibility of the preceding mechanism; the pelvis cannot rotate backwards on the hip-joints, because of the ligament of Bigelow. Flattening of the lumbar spine by backward rotation of the pelvis can only take place if the patient stands with flexed knees. D, flattening of the lumbar spine arising locally in the spine as a direct result of altered disc mechanics; on this theory flattening of the lumbar spine is not compensatory but tends to stretch the sciatic nerve even further.

time flexing the knees, because in the standing position the powerful Y-shaped ligaments of Bigelow, which lie in front of the hip-joints, are in tension and prevent backward rotation of the pelvis by more than a few degrees (fig. 2).

This criticism of reversed lumbar lordosis in disc protrusion as a compensatory mechanism can be further illustrated in a rather different way. In a lateral view of the skeleton in the standing position, the fifth lumbar vertebra lies almost vertically above the hip-joints. The sciatic nerve, emerging from the vertebral foramina, descends in almost a straight line, through the pelvis posterior to the hip-joint. If we look on this anatomical arrangement as the face of a clock, with the hip as the centre and the sacrum towards nine o'clock, it is apparent that tilting of the pelvis either backwards or forwards on the hip-joints so as to move the fifth lumbar vertebra between ten o'clock and two o'clock will alter the tension in the sciatic nerve only very slightly (because this region of the clock face, in relation to the direction of the sciatic nerve, corresponds, if one may mix analogies, to a dead centre in the movement of a crank and its connecting rod). If O'Connell's view were correct, it would be necessary for the fifth lumbar vertebra to occupy a position between ten o'clock and eight o'clock if small angles of pelvic tilt were to produce significant changes in the tension of the sciatic nerve. It is quite certain that a stance with 10° of hyperextension in the hips, if such a position could be achieved in the adult, would be detectable on clinical inspection.

Further evidence that lumbar kyphosis is not a compensatory mechanism to relax the sciatic nerves is suggested by the frequency with which it is associated with pronounced degrees of limitation of straight-leg-raising (S.L.R.) as follows:

In 9 cases with *complete reversal* of lumbar lordosis:

7 had S.L.R. under 40°,
2 had S.L.R. under 60°,
0 had S.L.R. under 80°,
0 had S.L.R. full.

In 48 cases with mere *flattening* of the lumbar spine:

37 had S.L.R. under 40°,
1 had S.L.R. under 60°,
8 had S.L.R. under 80°,
2 had S.L.R. full.

In 13 cases with normal *hollow* lordosis:

5 had S.L.R. under 40°,
2 had S.L.R. under 60°,
2 had S.L.R. under 80°,
4 had S.L.R. full.

Thus with lumbar kyphosis in all cases the S.L.R. was less than 60°; when the lumbar spine was merely flattened there were nearly four times as many cases with S.L.R. less than 60° as there were greater than 60°; and with a normal lumbar lordosis the distribution of limited S.L.R. showed no special trend.

Another attempt to explain reversed lumbar lordosis as a compensatory mechanism points out that in the flexed position of the spine the intervertebral foramina are increased in size, and therefore any extradural root which is compressed by a protrusion encroaching on the intervertebral foramen would be relieved of pressure by this mechanism. This is a tempting speculation, but it has never been convincingly established that compression of a nerve-root in the foramen is more than an occasional complication of disc protrusion, and O'Connell's view that tension, rather than compression, is the source of pain is most in keeping with the general clinical picture. In compression of the first sacral root by a protrusion from the fifth lumbar disc the first sacral foramen cannot lie at fault, because it has no relation to a disc being an intact bony aperture which cannot be encroached on; yet in involvement of the first sacral root there often exists a reversed lumbar lordosis.

For these reasons it seems certain that flattening of the lumbar spine in sciatica is not a reflex mechanism evoked to *reduce* tension or pressure in the affected root, and that it is most probably a primary deformity of the lumbar spine resulting directly from altered disc mechanics. When the disc protrudes posteriorly, the interval between the posterior margins of the vertebral bodies seems almost to be "jammed open" by the protruded disc, assisted in this by some loss of turgidity of the nucleus pulposus, causing slight collapse anteriorly between the bodies.

EFFECT OF FLEXION AND EXTENSION ON DISC PROTRUSION

The effect of flexion or extension on the prominence of a posterior disc protrusion is not generally known. In theory the flexed position should increase the protrusion, because in this position, anatomists state, the nucleus pulposus moves backwards. Begg and Falconer (1949) showed that a protrusion was better revealed by myelography, and therefore was presumably more prominent, when the spine was extended. On the other hand, some surgeons operate with the spine in strong flexion (in the knee-elbow position) whereas others have the spine almost straight; yet both seem satisfied with their ability to reveal a protrusion. It might seem an easy matter to test the effect of flexion and extension at operation, but in practice this observation is very difficult to make unless the movements of flexion and extension can be repeated several times, which is impossible in the operating-theatre.

It appears, on the whole, that neither flexion nor extension has any great effect on the size of a protrusion, and very few surgeons seem to have observed the so-called "concealed disc" of Dandy. In all probability, once a disc has been protruded, there is no cavity left for it to retreat into, and the protruded material, being tough and fibrous like boiled lobster and quite unlike the pasty centre of a normal disc, remains stuck in its abnormal position. The correct mental picture of a protruded disc is therefore better that of a wedge of solid material driven between the posterior margins of the vertebral bodies rather than that of a fluid hernia which is reducible like a hernial sac in the inguinal canal.

Variations, if any, in the size and shape of the protruded disc in flexion and extension, will therefore be direct local effects on the protrusion and not indirect effects communicated to it from the nucleus. On extension of the spine the posterior margins of the vertebral bodies will tend to "pinch off" the protrusion, and by relaxation of the overlying annulus fibrosus the protrusion might appear slightly more prominent. On flexion of the spine, separation of the vertebral bodies posteriorly might accommodate more protruded material within its own track, and, the overlying annulus fibrosus being rendered tense, might possibly make the prominence seem slightly less obvious. Whatever the mechanism, it seems safe to say that moderate variations in the position of the spine make only slight differences to the size of a protrusion and certainly not enough to determine whether a disc will be found at operation or not.

STRAIGHT-LEG-RAISING TEST

Mechanism

Limitation of S.L.R. is well known in sciatica and not uncommonly is recorded in the laconic phrase "Lasègue's sign positive." The tendency to regard this test merely as one of equal significance with four or five other physical signs, from which the final diagnosis is made as an arithmetic sum, is one which needs challenging. In its correct perspective the S.L.R. test, when recorded quantitatively in degrees, is of such importance in the diagnosis of disc protrusion—and more particularly in deciding which cases are likely to be benefited by operation—that its value should be regarded as being greater than that of all the other clinical or radiological signs put together. To justify this bold statement it is necessary to review our knowledge of the physical basis of the S.L.R. test.

Mechanical Basis of Test

The limitation of S.L.R. can be observed in the cadaver by removing the vertebral bodies from a lumbar spine through the posterior wall of the abdomen until the spinal theca is exposed and the fifth lumbar root is laid bare in its intervertebral foramen. It will then be found that if a straight leg is raised to its full extent (after rigor mortis has been broken down) the nerve-root will be seen to move in its foramen as a result of increased tension in the lumbar plexus, and will move by a distance which varies in different cadavers from 0·4 to 0·8 cm. Inman and Saunders (1942) estimated this range at 0·2 to 0·5 cm. and Falconer, McGeorge, and Begg (1948) reported it as 0·2 to 0·6 mm. It will be observed during this experiment that the sciatic nerve behaves as though it were devoid of elasticity, and general experience of the great nerve-trunks supports this.

The point I wish to emphasise is not so much that the nerve-root moves, or the amount by which it moves, but the *timing* of the movement of the root in relation to the movement of the leg. If movement in the root is closely scrutinised during slow elevation of the extended leg, it will be observed that the root remains quite stationary until the leg has reached an angle of 30° or 40° above the horizontal plane, after which it starts to move quite suddenly and quite briskly and goes on moving with the leg until an elevation of about 70° is reached. Beyond this point further movement of the root is sluggish; and by the time the leg has been raised to 90° the root will have been stationary for some time. This movement of the nerve-root in relation to the S.L.R. has been recorded cinematographically by means of a lever recording on a sheet of paper and attached at the other end to the nerve-root. The most impressive feature in this direct observation of the movement of the extradural roots in the cadaver, particularly when demonstrated cinematographically, is the suddenness with which the roots start to move.

The sudden start of movement after an initial lag can easily be explained by the taking up of slack in the sciatic nerve during the first arc of S.L.R.; but it is not at first clear why the movement, after being brisk during the middle arc, should thereafter tail off again as the leg reaches 90°. The first explanation that comes to mind is that the nerve-roots move briskly until the extradural nerve-roots become taut, and thereafter no further movement of the root is possible. But this simple explanation is unlikely, because it implies that the nerve-roots in the normal subject are exposed to tension before the completion of S.L.R., and it seems unlikely that normal roots should experience tension except at the most extreme limit of a normal range of movement. The tailing off of movement *without a very pronounced rise of tension* can be explained on the principle of "simple harmonic motion" if the following model is constructed:

Experimental Model (fig. 3).—A lath of wood is nailed by one end to a board so that it can pivot on the nail and thereby imitate the pivoting of the straight leg at the hip-joint. A second nail is driven into the board near the first nail but separated from it by a distance which represents the separation of the sciatic nerve from the axis of the hip. A piece of string is now tied to the "foot" end of the wooden lath to represent the nerve and carried behind the second nail to end at a point which represents an intervertebral foramen. It is now necessary to arrange a little slack in the string so that, when the wooden lath is raised to imitate S.L.R., the string becomes tight when the 40° position is attained. The interest now lies in the behaviour of the end of the string representing the nerve-root, while the wooden lath is raised to 90°. In the working model, as soon as the slack is taken up, the "root" moves rapidly during the middle arc of movement and less briskly when the lath is reaching the end of the S.L.R.

This simple model thus demonstrates that the tailing off of movement in the nerve-root is mainly due to the mechanical arrangement of the structures involved in S.L.R. on the principle of simple harmonic motion, and that it is unnecessary to suppose that in the normal subject it is caused by a progressive building up of high tension in the root.

Clinical Observations on S.L.R.

It is instructive now to examine the frequency and degree of limitation of S.L.R. in relation to the discovery of a protruded disc at operation.

Of 88 patients operated on the S.L.R. was limited to less than 40° in 63. (The only significance of this preponderance is that it reflects my selection of cases for operation.) Of these 63 patients with such limited S.L.R., 58 (92%) had protruded discs; whereas of the 25 patients with S.L.R. not so limited 16 (64%) had protruded discs. Thus with S.L.R. under 40° exploration proved negative in the proportion of 1 to 11·6 cases; whereas when S.L.R. was over 40° the proportion of explorations proving negative was 1 to 1·8.

Significance of Slight Degrees of Limitations of S.L.R.

The significance of *slight* degrees of limitations of S.L.R. in the diagnosis of disc protrusion needs considerable thought, because it may ultimately prove of the greatest importance in our understanding of sciatic pain.

The observations on the cadaver described above make it difficult to understand the pathological state of the nerve-root in a case where S.L.R. attains 90° on the normal side and 80° on the affected side, because in this type of case *the nerve-root has already passed its range of greatest excursion without evoking pain or hamstring spasm*. It is conceivable that the involvement of the nerve-roots in cases with only slight limitation of S.L.R. might not be of the same direct mechanical origin, caused by a space-occupying lesion, as in cases with gross degrees of limitation. It is not impossible that mild degrees of limitation of S.L.R. may be associated with *referred* sciatic pain—i.e., pain which originates in the disc itself even in the absence of a protrusion—and in these cases surgery directed to the removal of pressure

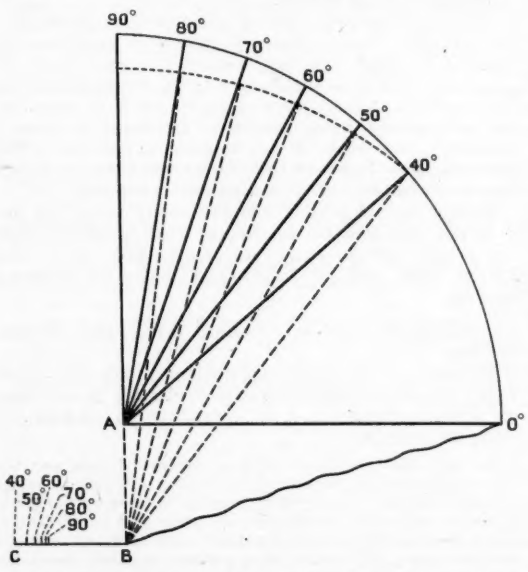

Fig. 3—Straight-leg-raising: solid radii from A, leg in different positions; interrupted radii from B, sciatic nerve in corresponding positions. When leg is raised to 40°, sciatic nerve is taut. Point C, taken in the nerve at the spine, will move towards B as the leg is raised past 40°. Successive positions of C show that movement is fairly rapid from S.L.R. 40° to S.L.R. 60° but slows up for the later positions of the leg.

from the nerve-root is likely to be followed by disappointing results.

From our general knowledge of pain arising in deep structures it is not unreasonable to believe that such pain would be evoked on an "all or none principle" and would partake of that quality known in the past as epicritic. With pain arising only at 70° or 80° of S.L.R. one can presume that the nerve-roots are not already stretched by a protruded disc; the pain is probably evoked in this case by the root being abnormally sensitive to stretching. The cause of the increased sensitivity is not necessarily removed by curetting out the adjacent intervertebral disc. In other words, I am tempted to suggest that limitation of S.L.R. has two different mechanisms: severe limitation to less than 40° implies a mechanical cause extrinsic to the root and evoked by the start of *movement* between the root and the skeletal structures; slight limitation, to not less than 70°, implies a cause of pain intrinsic to the root and evoked by *tension*, because it is not evoked during maximal movement of the root but only when rising tension is to be expected towards the end of S.L.R.

FORWARD FLEXION AND S.L.R. COMBINED

Limitation of forward bending of the spine is a very obvious feature of sciatica. To investigate forward bending it is convenient to distinguish five grades of flexion from the erect to the fully flexed position:

Grade 1, finger-tips reaching 3 in. short of the knee-caps.
Grade 2, finger-tips reaching the knee-caps.
Grade 3, finger-tips reaching 3 in. below the knee-caps.
Grade 4, finger-tips reaching to mid-tibiæ.
Grade 5, finger-tips reaching to ankles or toes.
(Measurements made with knees straight.)

Of the 88 patients operated on, 73 had limitation of forward flexion within the first three grades; of these 73 patients a protruded disc was found in 63 (86%) whereas of the remaining 15 patients with good forward flexion a protruded disc was found in 11 (73%), 4 cases were negative. Thus cases with bending limited to the first three grades had a negative exploration in the proportion of 1 to 6·3 cases, whereas cases with bending limited only in the last two grades had a negative exploration in the proportion of 1 case to 2·7. Evidently, therefore, bending alone is not quite so reliable a test for protruded disc as is S.L.R. alone.

Further reflection will show that it is impossible to attribute any significance to forward bending without at the same time correlating it with S.L.R., because forward bending is in fact nothing more than S.L.R. done in the standing position (although certain theoretical differences are superadded by the possibility that the spinal dura is in a different mechanical state; because, when S.L.R. is elicited on a couch, the spine is extended, whereas in forward bending S.L.R. is combined with a flexed spine).

It is perhaps not obvious, unless one has made observations specially with this point in view, how large a part of the movement of forward bending takes place at the hips and how small a part takes place in the spine. With a normal person lying supine in the position for the S.L.R. test the following correlations will be found:

20° S.L.R. is roughly equivalent to finger-tips reaching 3 in. short of knee-caps.
30° S.L.R. is roughly equivalent to finger-tips reaching knee-caps.
40° S.L.R. is roughly equivalent to finger-tips recahing 3 in. below knee-caps.
60°–80° S.L.R. is roughly equivalent to finger-tips reaching mid-tibiæ.

To touch the ankles or the toes from the supine position is impossible unless the person flexes the neck and raises the shoulders. These correlations between S.L.R. and forward bending are referred to later as being "anatomically consistent."

A B

Fig. 4—Radiographs showing the relatively small amount of movement which takes place in the lumbar spine between erect stance (A) and full forward bending (B).

Contribution of Spinal Flexion to Total Range of Forward Bending

If a spine is radiographed first in the erect position and next in full forward flexion, a surprisingly small range of movement is shown in the lumbar region. In full flexion the lumbar spine never achieves an anterior concavity; at the most the lumbar spine merely becomes straight by the obliteration of the normal lordosis (fig. 4). The full range of movement in the lumbar spine probably accounts for only about 20° of forward flexion in an adult without acrobatic powers.

This very limited range of movement in the spine is not at first obvious when a patient is seen bending forward to touch his toes, because the strongly flexed position of the head and neck, and the forward drooping of the shoulder blades, reveals the almost fixed curvature of the thoracic spine, which in the erect position is concealed from view. It is a common experience to find patients, after fusion of the lumbar spine, whose finger-tips reach to the mid-tibiæ on forward bending.

In the normal person who can easily touch his toes it is not unreasonable to suppose that in this position the sciatic nerves, extradural roots, and spinal dura are at their greatest length and under no abnormal tension.

Clinical Observations on Combined S.L.R. and Forward Flexion

To decide whether any diagnostic or prognostic significance in sciatica might be extracted from a combined S.L.R./flexion relation, it is instructive to construct a chart as in fig. 5.

In this chart the five grades of forward flexion and the four grades of S.L.R. are combined so as to give twenty S.L.R./flexion "boxes"; each "box" can be dubbed by the grade of flexion and S.L.R. it represents in terms such as 90/1, 40/2, &c. (meaning 90° S.L.R. in a patient with inability to touch his knee-caps, 40° S.L.R. in a patient able to reach his knee-caps, &c.).

By representing each case on the chart as a dot, it is possible to see the distribution of patients in the various "boxes" and, by using different symbols to indicate the cases in which a protruded disc was found at operation and those in which it was not, it is possible also to see simultaneously the distri-

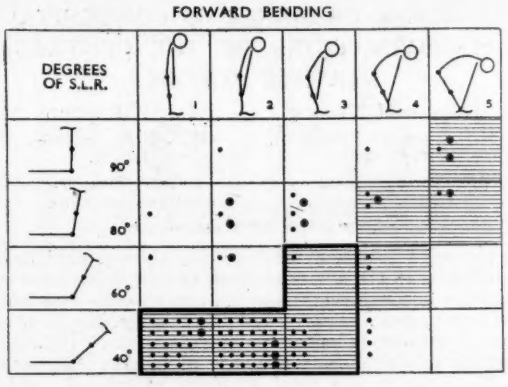

Fig. 5—Incidence of protruded discs in relation to S.L.R. and forward bending in 88 cases (see text).

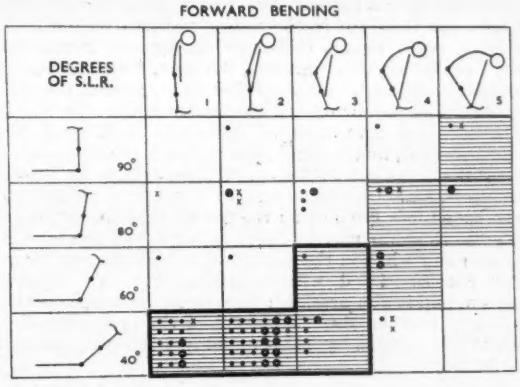

Fig. 6—Outcome of surgery in relation to S.L.R. and forward bending in 72 cases (see text).

bution of findings at operation in relation to S.L.R. and forward flexion.

The shaded boxes represent the combinations of S.L.R. and forward flexion which are anatomically consistent as previously described.

It will also be observed that the first four shaded boxes, on the left side of the chart—i.e., 40/1, 40/2, 40/3, and 60/3—have been further distinguished by being enclosed with a heavy black line. These enclosed boxes denote the combinations of S.L.R. and forward flexion which in addition to being anatomically consistent also denote pathological limitation of movement. The remaining boxes which have been shaded but which are not included in the heavy black line denote cases which are anatomically consistent but not necessarily pathological, because 90/5 is full flexion in the normal supple young person and 80/4 is normal forward flexion in most middle-aged or stocky patients.

After mastering these conventions in the S.L.R./flexion chart it is now possible to review the distribution of cases. Disregarding at this moment whether a protruded disc was found at operation or not we can see several broad features:

1. On the left side of the chart the physical signs in all the cases were broadly consistent in that there were no cases in which full S.L.R. occurred in combination with very marked limitation of forward flexion—i.e., there were no cases in boxes 90/1, 90/2, and 90/3, except for an isolated case in 90/2.

2. Similarly, on the right side of the chart the physical signs were broadly consistent in that there were no cases in which full flexion was present in combination with very severe limitation of S.L.R.—i.e., there were no cases in boxes 40/5 and 60/5.

3. Most of the cases in the chart fell into the 40° S.L.R. group, and it is interesting to observe that most of these showed anatomically consistent degrees of S.L.R. and flexion in that they mainly fell into the 40/1 and 40/2 boxes.

4. The rest of the cases (except those concentrated in the 40/1, 40/2, and 40/3 boxes) are more or less evenly distributed across the chart without any significant trend, though avoiding the boxes denoting extreme inconsistency enumerated in paragraphs 1 and 2.

S.L.R./Flexion Relation in Diagnosis

As regards the diagnosis of protruded disc it can be seen that this S.L.R./flexion chart, though raising many interesting features worthy of future study, perhaps does not yield any diagnostic evidence superior to the information gained from the S.L.R. test alone; it is in relation to negative evidence and the results of operation that the S.L.R./flexion chart is most significant.

In the four boxes in the top right-hand corner of fig. 5—i.e., 90/4, 90/5, 80/4, and 80/5—where minimal limitation of S.L.R. was combined with minimal limitation of forward flexion, no protruded disc was found in 4 cases out of 9.

In fig. 5 the boxes lying to the left of the "consistent" (shaded) boxes represent those cases in which forward flexion was *less* than might have been expected from the degree of S.L.R. discovered in the supine position. Though the figures in the chart are numerically inadequate to prove the point, it seems that when forward flexion is limited more than one would expect from the degree of S.L.R., a protruded disc is unlikely to be found. Possibly these patients may be more apprehensive of forward flexion, which they understand, than they are of the S.L.R. test, which they do not understand, and possibly this anomaly implies a psychoneurotic element which disturbs the consistency of the clinical picture.

S.L.R./Flexion Relation in Prognosis

It is conceivable that the relation of S.L.R. and flexion to the *results* of operation might reveal the most significant connection; because the results of surgery in the psychoneurotic would probably be poor, whereas, on the other hand, "negative" cases, in which a protruded disc was exposed but not recognised, might reveal themselves as good results because the correct mechanical treatment was employed. I believe that this is in fact what is found. In S.L.R./flexion chart no. 2 (fig. 6), it will be seen that out of a total of 49 cases in the "consistent and pathological boxes"—i.e., 40/1, 40/2, 40/3, 60/3, and 60/4—only 1 case was "no better" for the operation. It is significant that after operation this patient revealed herself as a gross hysteric; and, though she was known to be psychoneurotic before the operation, the gravity of her neurosis was not suspected until her behaviour after the operation made it certain.

Out of 14 cases outside the "consistent boxes" plus the 7 cases in the "consistent but not pathological boxes"—i.e., 90/4, 90/5, 80/4, and 80/5—making a total of 21 cases, there were 7 cases no better for the operation. Thus the proportion of failures to good results was 1 to 49 in the "consistent and pathological" boxes and 1 to 3 in the "inconsistent" boxes and the "consistent but non-pathological" boxes.

Though the numbers in this series are not great their distribution seems significant, and they suggest that the best results of disc surgery are to be obtained when the limitation of forward flexion is anatomically consistent with the amount of S.L.R. elicited passively in the supine position.

Possibly inconsistencies in the S.L.R./flexion relation are objective demonstrations of psychoneurosis; but without invoking this too easy explanation it is difficult

to explain how a patient should have gross limitation of S.L.R., less than 40° in the supine position, and still be able to reach to the mid-tibiæ on forward flexion (of the 3 patients in this condition, box 40/4, 2 were no better for the operation). On the other hand, several possible explanations can be offered for the mechanism by which a patient can have S.L.R. on both sides to 80° and yet on forward flexion be only able to reach the knee-caps; 4 cases in this category showed three results no better for operation. This inconsistency could be explained on psychoneurotic grounds on the theory that the patients' experience in the past has been that forward flexion will cause pain, whereas the S.L.R. test is unknown to them and not associated with apprehension. An organic explanation is also possible: that in some patients in the standing position the prominence of the protruded disc might be increased by body-weight and the root pressure made worse.

In the cases which had a consistent S.L.R./flexion relation, but in which only slight limitation of either was present—i.e., boxes 90/4, 90/5, 80/4, and 80/5—a high incidence of poor results is perhaps not unexpected, because these boxes contain all the cases within the limits of "normal" physical signs.

SCOLIOSIS

Lateral deviation of the spine is a characteristic feature in the clinical examination of many cases of protruded disc, but an analysis of 82 cases, in which scoliosis was found in 39, did not indicate that any particular significance could be attached to scoliosis in rendering certain the subsequent discovery of a protruded disc at operation. Of 43 cases without scoliosis, a protruded disc was not found at operation in 9—i.e., 1 case in 4·8, or 20%—whereas of the remaining 39 cases with scoliosis a protruded disc was not found at operation in 5—i.e., 1 case in 7·8, or 13%.

Scoliosis was usually associated with limitation of S.L.R. but it did not yield information as reliable as that obtained from S.L.R. alone, because scoliosis seemed to vary from day to day according to the amount of rest the patient had taken before examination. No case of "alternating" scoliosis was encountered in this series, but cases were often seen which had scoliosis one day and none at all the next. Scoliosis appeared to subside on rest in bed much more quickly and more completely than limitation of S.L.R., even though one knew that the protrusion was still present and likely to cause further symptoms if activity was resumed; for this reason, taken by itself, scoliosis is not to be regarded as a reliable sign.

SUMMARY

Two clinical types of sciatica are distinguished: (1) those with severe limitation of straight-leg-raising (S.L.R.) which almost always reveal a protruded intervertebral disc and respond well to surgery; and (2) those with slight limitation of S.L.R. which often do not reveal a protruded disc and often show poor results after surgery.

The mechanism of S.L.R. test is examined. The suggestion is made that where S.L.R. evokes pain under 40° it indicates the *movement* of the root against a protruded disc; and that, when S.L.R. is limited to only 70° or 80° the pain is caused by the start of *tension* on a root which is abnormally sensitive, from causes intrinsic to the root, and not necessarily accompanied by a demonstrable lesion of an intervertebral disc.

I am indebted to Sir Harry Platt for reading my manuscript and for enabling me to concentrate on this type of case during the past four years in the orthopædic department of the Manchester Royal Infirmary.

References at foot of next column

SEASONAL INCIDENCE OF CONGENITAL MALFORMATIONS OF THE CENTRAL NERVOUS SYSTEM *

THOMAS MCKEOWN
M.D. Birm., D. Phil. Oxfd, Ph.D. McGill
PROFESSOR OF SOCIAL MEDICINE

R. G. RECORD
M.D. Birm., D.Obst., D.P.H.
LECTURER IN SOCIAL MEDICINE

UNIVERSITY OF BIRMINGHAM

ATTEMPTS to relate the incidence of congenital malformations to the season of birth or conception have so far been unconvincing. The relevant literature on man scarcely merits detailed comment; it consists of conflicting reports in which numbers are small (Dittrich 1929) or in which insufficient account is taken of seasonal fluctuations in the total numbers of related births (Petersen 1934, Murphy 1936). There have been few observations on experimental animals: Landauer (1943) noted seasonal variations in the proportion of malformed chick embryos; and Holt (1948) referred to a similar report by Wright on polydactylism in guineapigs.

We have restricted our inquiry to malformations of the central nervous system, which have three advantages for investigations requiring statistical evidence: (1) they usually lead to death of the fœtus in utero or shortly after birth and are therefore notified as stillbirths or deaths in the first year of life; (2) they can usually be recognised on external examination, even by persons with no specialised knowledge; and (3) they are common enough to give reasonable numbers—of all malformations notified as stillbirths or first-year deaths about 70% and 40% respectively involve the central nervous system.

For investigation of seasonal incidence we have information from two sources: (1) the annual reports of the Registrar-General for Scotland, which give the causes of stillbirths since 1939; and (2) observations on 930 consecutive children born in Birmingham in 1940–47 with malformations of the central nervous system.

SEASON OF BIRTH

Stillbirths Only

Table I gives for Scotland in 1939–46 the monthly stillbirth-rates attributable to fœtal defects. The rates for hydrocephalus, spina bifida, and anencephalus are shown separately, and the remaining six subdivisions of fœtal defect included by the Registrar-General have been grouped as "other." All but anencephalus show no consistent relationship between incidence and month of birth. The group "other" is in any case unsuitable for investigation; and, since many babies with hydrocephalus and spina bifida survive birth, statistics restricted to stillbirths are also unsatisfactory. We may therefore turn our attention to anencephalus, which as a cause of stillbirth more nearly satisfies the three criteria of accurate diagnosis, complete returns, and adequate numbers.

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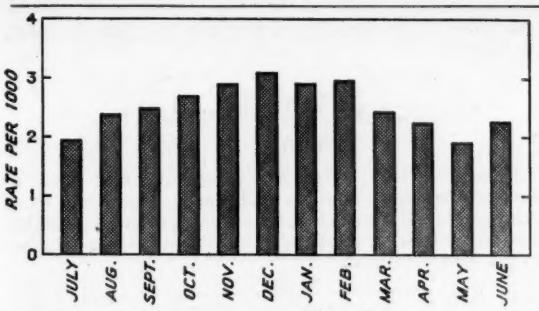

Fig. 1—Monthly stillbirth-rates attributed to anencephalus in Scotland in 1939–46.

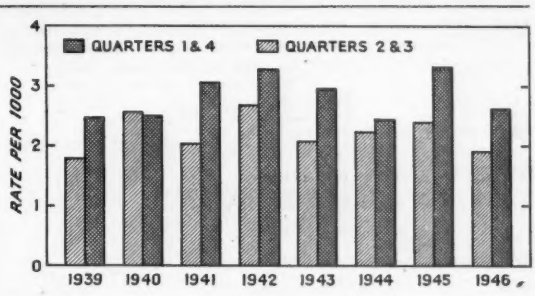

Fig. 2—Half-yearly stillbirth-rates attributed to anencephalus in Scotland in 1939–46.

The stillbirth-rate for anencephalus is lowest in May (1·91) and highest in December (3·09); between these two months the rate increases and decreases fairly regularly (see also fig. 1). Subsequent comparisons are based on quarterly rates, and on half-yearly rates obtained by grouping the second with the third quarter, and the fourth with the first. This choice of groups is arbitrary but was guided by the fact that our data for Birmingham were only available by quarters.†

Table II gives quarterly and half-yearly rates for 1939–46 (see also fig. 2). For the whole eight-year period the rates for the half-years are 2·20 (second and third quarters) and 2·83 (fourth and first quarters), the difference being $0·63 \pm 0·12$. With a single exception (1940) each year shows the same result; but because of the smaller numbers the errors of the differences are greater than for the whole period.

Stillbirths and First-year Deaths

The Birmingham material has already been fully discussed (Record and McKeown 1949). Briefly, data were recorded for 930 consecutive malformations of the central nervous system certified as the causes of stillbirths or of first-year deaths in the City of Birmingham in 1940–47. Our sources of information were (1) records of the City maternity and child-welfare department (available for all 930 malformations); and (2) additional data elicited by field inquiry from 742 mothers who gave birth to 755 children with these malformations. A control group of 876 mothers of children who were not malformed was obtained by selecting every two-hundredth name from the registers of live births and stillbirths of the same years, and interviews were completed with 742 of these mothers. Table III shows the way in which the 930 malformations have been classified.

Table IV gives for anencephalus, spina bifida, and hydrocephalus quarterly and half-yearly deaths (stillborn and live born) per 1000 births. Since they include first-year deaths, the rates for spina bifida and hydrocephalus may be examined with more confidence than could be justified for the stillbirth-rates shown in table I; they show no significant variation. The half-yearly rates for anencephalus again show a substantial difference ($0·76 \pm 0·24$), and the examinations which follow of season of conception and of the effect of birth rank are therefore restricted to this malformation. The quarterly rates for Scotland and Birmingham are illustrated in fig. 3.

† For 1940–47 Birmingham total births were known by quarters but not by months; hence quarterly, but not monthly, rates could be calculated.

SEASON OF CONCEPTION

The month of conception is not given for Scottish stillbirths; and, since many of the children with malformations are born before term, it would be wrong to assume that conception took place, on the average, nine months before birth. In the Birmingham inquiry mothers were asked the duration of gestation in months, and the month in which the last menstrual period had occurred was then readily determined from the month of birth. Because the same information was not avail-

TABLE I—MONTHLY STILLBIRTH-RATES (PER 1000 TOTAL BIRTHS) ATTRIBUTED TO FŒTAL DEFECTS (REGISTRAR-GENERAL FOR SCOTLAND 1939–46)

Malformation	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
													No.	Rate
Hydrocephalus ..	1·43	1·44	1·37	1·22	1·34	1·36	1·35	1·51	1·40	1·41	1·48	1·33	1057	1·38
Spina bifida ..	0·56	0·48	0·48	0·55	0·53	0·47	0·28	0·40	0·43	0·40	0·43	0·53	352	0·46
Anencephalus ..	2·92	2·98	2·44	2·27	1·91	2·29	1·94	2·37	2·48	2·69	2·90	3·09	1916	2·51
Other	1·75	2·09	1·92	1·87	1·67	1·63	1·93	1·97	1·95	1·78	1·91	2·00	1427	1·87
All defects ..	6·65	6·99	6·20	5·91	5·45	5·76	5·50	6·26	6·26	6·28	6·72	6·95	4752	6·22
Total births ..	63,027	57,793	65,216	65,661	70,040	65,494	66,863	62,342	60,542	65,761	58,630	62,419	763,788	..

TABLE II—QUARTERLY AND HALF-YEARLY STILLBIRTH-RATES (PER 1000 TOTAL BIRTHS) ATTRIBUTED TO ANENCEPHALUS (SCOTLAND 1939–46)

Quarter	1939		1940		1941		1942		1943		1944		1945		1946		Total	
	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year	Quarter	Half-year
Second	1·99	1·78	2·19	2·55	1·85	2·05	2·59	2·68	2·32	2·08	2·08	2·23	2·53	2·40	1·72	1·91	2·15	2·20
Third	1·55	(a)	2·95	(a)	2·25	(a)	2·78	(a)	1·82	(a)	2·40	(a)	2·27	(a)	2·08	(a)	2·26	(a)
Fourth	2·22	2·48	2·89	2·51	3·15	3·05	3·49	3·28	2·73	2·96	2·49	2·45	4·02	3·33	2·33	2·63	2·89	2·83
First	2·73	(b)	2·16	(b)	2·96	(b)	3·06	(b)	3·18	(b)	2·41	(b)	2·64	(b)	2·99	(b)	2·77	(b)
*	0·70 ±0·31		−0·04 ±0·33		1·00 ±0·33		0·60 ±0·36		0·88 ±0·32		0·22 ±0·31		0·93 ±0·36		0·72 ±0·29		0·63 ±0·12	

*Difference between half-years (*b*) − (*a*).

TABLE III—CLASSIFICATION OF 930 CONSECUTIVE MALFORMATIONS OF THE CENTRAL NERVOUS SYSTEM RESULTING IN STILLBIRTHS OR INFANT DEATHS (BIRMINGHAM 1940–47)

Classified as	Type of malformation	No.
Anencephalus	Anencephalus alone	332 } 366
	Anencephalus and spina bifida ..	34 }
Spina bifida *	Spina bifida alone	255
	Spina bifida and hydrocephalus ..	129
	Spina bifida and encephalocele ..	4 } 389
	Spina bifida, hydrocephalus, and encephalocele	1
Hydrocephalus	Hydrocephalus alone	150
Other	Encephalocele alone	11 } 25
	Other central nervous malformations †	14 }
Total		930

* Spina bifida includes spinal meningocele, meningomyelocele, and myelocele.
† Include microcephaly (8), unspecified congenital cerebral defect (4), and occipital meningocele (2).

able for all related births, seasonal rates cannot be given for conception, and we rely on a comparison of quarterly and half-yearly percentage distributions based on the month of the last menstrual periods preceding births of 363 anencephalics and preceding births of 741 controls free from deformities (table v). The proportion of conceptions in the half-year from April to September is substantially greater for children with malformations than for controls. Once again it must be emphasised that the choice of quarterly and half-yearly figures is arbitrary. For example, the differences revealed in table v would be slightly exaggerated by comparing the half-years from March to August and from September to February. We have preferred, however, to preserve the groups used in the earlier tables.

EFFECT OF BIRTH RANK ON SEASONAL INCIDENCE

Before entertaining any alternative explanation for the observed seasonal fluctuation in the incidence of anencephalus, we should consider the effect of birth rank, since we have found that the risk of anencephalus and spina bifida is associated with parity and is highest for first births (Record and McKeown 1949). By expressing the figures in tables I, II, and IV as rates we have taken account of variation in the numbers of total births; we have not allowed for the possibility of seasonal changes in the proportion of births at different parities.

The Scottish data provide no direct evidence on this question. The number of marriages, however, is not constant from month to month; this may influence the relative proportions of first and later births at different seasons. For 1939–46 the number and proportion of marriages in Scotland in each of the four quarters were as follows:

First quarter	81,243	(22·26%)
Second quarter	90,406	(24·77%)
Third quarter	102,842	(28·17%)
Fourth quarter	90,554	(24·81%)
Total ..	365,045	

The mean interval between marriage and first birth is shorter than nine months, and the fact that the percentage of marriages is highest in the third quarter might have some bearing on the high incidence of anencephalus in the winter months.

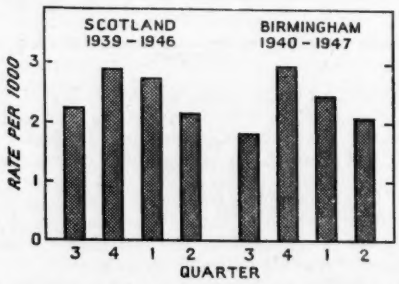

Fig. 3—Quarterly stillbirth-rates attributed to anencephalus in Scotland 1939–46 and in Birmingham 1940–47.

Birth rank was also unknown for all Birmingham births in 1940–47, but was recorded by field inquiry for 364 anencephalics and 742 controls free from deformities. This information is used in table VI to separate for first and later births the quarterly and half-yearly percentage distributions. For first births the proportion of anencephalics born in the fourth and first quarters was substantially greater than the proportion of controls. The same difference is also exhibited for later births, but is much less striking.

On this evidence it seems unlikely that the seasonal variation in the incidence of anencephalus is explained by changes in the relative proportions of first and of later births. One further point supports this conclusion: the increased risk of malformation associated with first birth was noted for both spina bifida and anencephalus; yet the quarterly and half-yearly rates for spina bifida (table IV) show no seasonal differences.

DISCUSSION

There is an interesting difference in seasonal incidence between anencephalus and other malformations of the central nervous system. This may provoke the suggestion that the incidence of anencephalus is related to the seasonal incidence of infectious diseases, but no history

TABLE IV—SEASONAL INCIDENCE OF MALFORMATIONS OF THE CENTRAL NERVOUS SYSTEM RESULTING IN STILLBIRTHS OR INFANT DEATHS (BIRMINGHAM 1940–47)

Quarter	Total births		Anencephalus			Spina bifida			Hydrocephalus			Other †	Total		
	Quarter	Half-year	No.*	Rates Quarter	Rates Half-year	No.*	Rates Quarter	Rates Half-year	No.*	Rates Quarter	Rates Half-year	No.*	No.	Rates Quarter	Rates Half-year
Second ..	41,036 }	80,053	85	2·07 }	1·94	99	2·41 }	2·45	39	0·95 }	1·04	7	230	5·61 }	5·61
Third ..	39,017 }		70	1·79 }	(a)	97	2·49 }	(a)	44	1·13 }	(a)	8	219	5·61 }	(a)
Fourth ..	38,871 }	78,254	115	2·96 }	2·70	92	2·37 }	2·40	32	0·82 }	0·83	4	243	6·25 }	6·03
First ..	39,383 }		96	2·44 }	(b)	96	2·44 }	(b)	33	0·84 }	(b)	4	229	5·82 }	(b)
Unknown ..			0			5			2			2	9		
Difference between half-years (b) − (a)	..		+0·76 ±0·24			−0·05 ±0·25			−0·21 ±0·15			..	+0·42 ±0·38		

* Stillbirths and infant deaths are added together.
† In view of the small numbers rates have not been calculated.

TABLE V—MONTH OF LAST MENSTRUAL PERIOD PRECEDING BIRTH OF 363* ANENCEPHALICS AND 741† CONTROLS (BIRMINGHAM 1940–47)

Month of last menstrual period	Anencephalus			Controls			Difference	
	No.	Percentage		No.	Percentage			
		Quarter (*a*)	Half-year (*b*)		Quarter (*c*)	Half-year (*d*)	(*a*) − (*c*)	(*b*) − (*d*)
April	42			56				
May	34 } 111	30·58		61 } 177	23·89		+6·69 ±2·81	
June	35		58·13	60		50·20		+7·93 ±3·20
July	42			56				
Aug.	33 } 100	27·55		69 } 195	26·31		+1·24 ±2·84	
Sept.	25			70				
Oct.	23			68				
Nov.	17 } 70	19·28		52 } 183	24·70		−5·42 ±2·69	
Dec.	30		41·87	63		49·80		−7·93 ±3·20
Jan.	19			53				
Feb.	33 } 82	22·59		57 } 186	25·10		−2·51 ±2·75	
March	30			76				
Total	363		100·0	741		100·0	..	..

* For 3 of the 366 anencephalics the duration of gestation was unknown.
† See text for discussion of controls; in 1 case the duration of gestation was unknown.

TABLE VI—SEASONAL INCIDENCE OF ANENCEPHALUS FOR FIRST AND LATER BIRTHS * (BIRMINGHAM 1940–47)

Quarter	Anencephalus			Controls †			Difference	
	No.	Percentage		No.	Percentage		(*a*) − (*c*)	(*b*) − (*d*)
		(*a*)	(*b*)		(*c*)	(*d*)		
				FIRST BIRTHS				
Second	38	22·09 }	38·95	61	24·21 }	51·19	−2·12 ±4·18 }	−12·24 ±4·93
Third	29	16·86 }		68	26·98 }		−10·12 ±4·15 }	
Fourth	58	33·72 }	61·05	65	25·79 }	48·81	+7·93 ±4·49 }	+12·24 ±4·93
First	47	27·33 }		58	23·02 }		+4·31 ±4·27 }	
Total	172	..	..	252	..	..	..	..
				LATER BIRTHS				
Second	47	24·48 }	45·83	123	25·10 }	50·82	−0·62 ±3·68 }	−4·99 ±4·26
Third	41	21·35 }		126	25·71 }		−4·36 ±3·66 }	
Fourth	55	28·65 }	54·17	125	25·51 }	49·18	+3·14 ±3·75 }	+4·99 ±4·26
First	49	25·52 }		116	23·67 }		+1·85 +3·78 }	
Total	192	..	..	490	..	..	..	..

* For 2 of the 366 anencephalics the birth rank was unknown.
† See text for discussion of controls.

TABLE VII—COMPARISON BETWEEN THREE MAIN GROUPS OF CENTRAL NERVOUS MALFORMATIONS (BIRMINGHAM 1940–47)

—	Anencephalus	Spina bifida	Hydrocephalus
Incidence.			
Stillbirth-rate per 1000 births	2·19	0·76	0·71
Infant mortality-rate per 1000 live births	0·12	1·75	0·25
Mortality per 1000 total births	2·31	2·46	0·95
Secular trend in 1940–47	Downward	Downward	Constant
Seasonal incidence of:			
Conception	Raised from April to September	—	—
Birth	Raised from October to March	No significant variation	No significant variation
Association of incidence with:			
Birth rank	Well-marked	Well-marked	Slight
Maternal age	Slight	Slight	Well-marked
Sex-incidence (percentage of males) *	26·7	43·3	50·9
Fertility of mother:			
Period of infertility preceding all pregnancies	Slightly shorter than average	Slightly shorter than average	Slightly shorter than average
Period of infertility preceding pregnancy resulting in malformation	Slightly shorter than average	Slightly shorter than average	Longer than average
Results of pregnancies not resulting in recognisable malformations:			
Abortion-rate per 1000 known conceptions †	117	107	98
Stillbirth-rate per 1000 births ‡	52	22	89

* Data given by Registrar-General for Scotland (1939–46).
† Abortion-rate for mothers of controls = 75 per 1000 known conceptions.
‡ Stillbirth-rate for mothers of controls = 23 per 1000 births.

of a specific fever during pregnancy was elicited from mothers who gave birth to the children with malformations.

Data already published (Record and McKeown 1949, 1950a) suggest other biological differences between the three main types of central nervous malformations, and these are summarised in table VII. We shall postpone detailed comment until we have presented evidence from a study of 69 pairs of twins exhibiting malformations of the central nervous system (Record and McKeown 1950c). Since attention may be focused on secular trends, we should emphasise that the decline in the annual incidence of anencephalus and spina bifida in Birmingham in 1940–47 may partly be explained by changes in the parity structure of the population of mothers.

The evidence obtained in this inquiry suggests that the risk of a later malformation depends to some extent

TABLE VIII—RISK OF MALFORMATION FOR SIBS BORN SUBSEQUENT TO A CHILD WITH CENTRAL NERVOUS MALFORMATION (BIRMINGHAM 1940–47)

No. of sibs	No. of malformations		Malformation-rate	
	Observed	Expected*	Observed	Expected
470	13	2·12	2·77 ±0·76%	0·45%

*For details of the method used to obtain expected numbers of malformations see Record and McKeown (1950b).

on the type of the first malformation, but numbers do not permit us to speak with confidence on this point, which is therefore omitted from table VII. When all malformations of the central nervous system are grouped together, the incidence in later sibs is seen to be about six times greater than the expected rate (table VIII).

SUMMARY

The seasonal incidence of births with malformations of the central nervous system has been examined in material from two sources: (1) the annual reports of the Registrar-General for Scotland for 1939–46; and (2) records of 930 consecutive malformations of the central nervous system certified as the causes of stillbirths or of first-year deaths in Birmingham in 1940–47.

The incidence of anencephalus is significantly higher in children born in the half-year October–March than in those born in the half-year April–September.

There is no evidence of seasonal variation in the incidence of spina bifida or of hydrocephalus.

It is unlikely that the seasonal variation in the incidence of anencephalus can be explained by changes in the relative proportions of first and of later births. This possibility was explored because the risk of anencephalus is higher for first than for later births.

The data for anencephalus, spina bifida, and hydrocephalus are tabulated to show the main differences.

The incidence of central nervous malformations in sibs born after the birth of a child with such malformation is about six times the expected rate.

We are grateful to Miss Catherine Wall and Miss Eileen Gibson for their careful assistance in the preparation of this paper, and to Dr. Jean Mackintosh and members of the Birmingham Maternity and Child-Welfare Department who made available to us the records of the department.

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INFECTION OF THE DIGITAL PULP SPACE

T. G. LOWDEN
B.M. Oxfd, F.R.C.S.
SURGEON, SUNDERLAND ROYAL INFIRMARY

IN the last three years many articles on septic hands have been published. Most of them have come from the teaching hospitals, have covered a comparatively short period, have illustrated some special investigation, and have been the personal series of individual surgeons or of a team. All have included cases of pulp-space infection. Some workers (Bolton et al. 1947, Webster 1947, Barclay 1949) have classified such cases separately, whereas others (d'Abreu et al. 1947) have included them with paronychia. Some have illustrated the value of penicillin (Harrison et al. 1949); others have shown it to be useless (Webster 1947). All have at least proved that in many centres the septic hand is at last receiving the attention and skill which its impact on industry demands. The *Lancet* (1947, 1949) and the *British Medical Journal* (1949) have emphasised the value of that attention.

But a larger picture should, I believe, be drawn. Even with increasing interest and attention, most septic hands are not treated in teaching centres by experienced surgeons, with full teaching-centre facilities, inpatient accommodation available, and a comparatively leisured operative ritual. Nor is it likely, in the immediate future, that they will be. I therefore report three years' work in a casualty department where septic hands are treated as an item (albeit an important one) in the daily round, where the majority are operated on by a junior casualty officer (changed at least once in six months), and where the time spent on each case must be kept at a minimum. It is not a personal series and it includes all cases with adequate records, whether easily classified or not.

With advances in chemotherapy, streptococcal lymphangitis in this clinic has been thrust almost into insignificance. A few days' penicillin therapy, sometimes with sulphonamides, has suppressed the "streak" which twenty years ago threatened such serious, sometimes fatal, results. The incapacitating lesion which concerns us now is a focal necrosis of fibro-fatty tissue, usually due to the staphylococcus. Most of even these infections become localised quickly and are relieved by incision, and the patients are fit for work again within a fortnight. These infections include the volar compartments (mid and proximal) of the fingers, the "web space" infection, the hair follicle on the dorsum, and most of the subcutaneous infections of the palm and the thenar and hypothenar eminences. Penicillin therapy in the early stages may lead to resolution or to limitation of spread, but most patients do not attend early, and late chemotherapy does not then reduce the total period of incapacity.

The condition causing the longest incapacity, and often permanent disability, is the pulp-space infection. With persistence of cavitation the period of incapacity for work averages twenty days, and osteitis of the phalanx, when present, increases the period to fifty-one days. Of the 438 cases of pulp-space infection reviewed in this paper, 72 (16%) developed osteitis (14% in 1947, 22% in 1948, and 12% in 1949). In fact osteitis has been so common and important a mishap that an attempt has been made to consider every possible ætiological factor. Here, however, I shall discuss only those factors on which, it is hoped, some conclusion can be reached.

Kanavel, Iselin, Bunnell, and many others, in standard textbooks, all teach that osteitis is the result of ischæmia of the phalanx caused by the pressure of inflamed tissue on the nutrient vessels passing to the distal two-thirds of the bone. Bolton et al. (1947) and Pilcher et al. (1948) question this and regard osteitis as the result of a lymph-

atic convection, or an infective thrombosis of the vessels. Standard textbooks also describe a standard incision for all cases, and casualty officers take up their appointment with this incision as their sole weapon against pulp-space infections. All authorities agree that infection of bone is established much earlier than X-ray evidence indicates, and it is a short step from there to the comfortable assumption that it is established before treatment at the clinic is begun. I am not sure that this short step is a safe one.

In 1947 and 1948 at this clinic the Kanavel "hockey-stick" incision (single or bilateral) was used in almost all cases. There were 6 (barbarous, mutilating, and outspokenly discouraged) "alligators." The pulp-space infection was regarded as an emergency, and an early incision was made in 94% of cases. 3 cases (6·6%) treated thus within three days of onset developed osteitis. Of the late cases 22% developed osteitis. Separate analyses for cases treated with and without penicillin showed no significant difference, though penicillin had been given in what is generally regarded as adequate dosage (250,000–300,000 units in oil, b.d.).

CONSERVATIVE TREATMENT

More recently an attempt has been made to assess the application of the views of Pilcher et al. (1948) and of Harrison et al. (1949) to a clinic of this type. Conservative treatment, as defined by them, consists essentially in complete rest to the whole hand, local applications of dry heat, and penicillin injections. It is indicated in cases seen before there is evidence of pus. In this clinic the conditions required are obtained in the minority of cases. Only 18% of all pulp-space infections treated are seen within four days of onset. Moreover, the principle of conservative treatment had to be applied cautiously. Early disasters almost certainly due to delay in treatment (either outside or inside the clinic) were vivid memories, and an over-all reduction of a few days' attendance would be dearly bought if the incidence of osteitis increased even a little. I have seen no serious harm done by Kanavel's incision in early cases, though I am prepared to accept that it may be unnecessary. I have seen much harm result from delay.

TABLE I—CONSERVATIVE TREATMENT OF CASES SEEN THREE DAYS OR LESS FROM ONSET

—	1948	1949	Duration of symptoms (days)	Days under conservative treatment	Average incapacity (days)	
					1948	1949
Cases ending in resolution	7 (21%)	7 (27%)	1–3	2–3	6	7
Cases requiring later incision	4 (18%)	5 (20%)			10	9

Percentages indicate proportion of cases in which conservative treatment was applicable. In 1949, 8 cases with longer histories were also treated. Their results are included in a later table.

I have not found that all cases promptly become painless with absolute rest, elevation, splintage, and penicillin, and I am reluctant to deny the relief of a well-placed incision in cases which do not respond promptly. My practice now is to treat early cases (usually three days or less from onset, but mild cases of longer duration) for twenty-four hours conservatively and, if they respond, to continue until localisation or resolution takes place. No conservative treatment is continued for longer than twenty-four hours if there is not prompt response, nor is it undertaken if it has been strictly but unsuccessfully attempted outside before the case comes to the clinic. Harrison et al. (1949) found that delay in operating on cases showing significant swelling (they measured the swelling) was unprofitable, and discontinued this part of their investigation. I believe that their group showing over 20% swelling corresponds approximately to our clinical group of those who do not respond to twenty-four hours' conservative treatment, and I am therefore in agreement with them. If incision is necessary in successful conservative cases, a local incision is made, only the abscess cavity is decompressed, and healing is rapid. Incision in those not responding within twenty-four hours is usually a single hockey-stick incision, almost but not quite "through and through."

The results of this approach to early cases are set out in table I. The percentages indicate the proportion of early cases in which conservative treatment was applicable. The majority required immediate incision.

OSTEITIS

Osteitis of the distal phalanx resulting from pulp-space infection may be divided into three fairly well-differentiated types:

Type I.—Not infrequently a terminal subonychia is associated with necrosis of the adjacent part of the nail bed and pulp. This may lead to osteitis of the tip of the phalanx. Unroofing the area (the roof includes some nail as well as cuticle) is followed by rapid resolution, and there is no tendency to spread. It causes no permanent disability and does not greatly prolong incapacity. It accounted for 30% of osteitis cases in the whole period. To include these cases in a general analysis of osteitis gives optimistic figures.

Type II.—Pulp-space infection which does not localise promptly may lead to a superficial osteitis—not merely a periostitis, as often described—in the volar surface of the phalanx. Judging by its radiological appearances, this may well be brought about by convection of infection from the pulp space by lymphatics. The bone seldom if ever sequestrates, but the osteitis prolongs the incapacity period. 24% occurred in the series.

Type III.—Massive necrosis with the formation of a sequestrum occurs in our series too frequently (45%). Not only does it take the longest time to heal but also it is the only type leaving a permanent bony deformity. In some the mechanism is clear. The patients come to their first attendance with a "bag of pus." Exploration reveals a thin crust of true skin and nail bed with the phalanx holding up the middle like a tent-pole. Vessels are destroyed on all sides, and loss of most of the phalanx is almost inevitable.

I further divide all cases of osteitis into those established when first seen at the clinic, and those developing during treatment. My criteria for the former are (1) observation, at operation, of destruction (not merely exposure) of bone, (2) X-ray evidence, or (3) spontaneous sequestration within the first ten days' treatment. I regard all the rest as late cases; for them I blame myself, and in treating them I hope to improve. In 1947 we had 4 cases sequestrating late in the course, in 1948 we had 9, and in 1949 we had none. Types I and II of osteitis occurring late have shown no sign of improvement yet.

CENTRAL SINUS

Iselin (quoting Klapp) states that a central sinus indicates osteitis of the phalanx. I have not found this so. Only 19 of 59 cases presenting with, or developing, a central sinus had osteitis; 6 had massive necrosis (type III).

I suspect that many cases presenting with a central sinus, developing one under conservative treatment, or having extensive destruction of soft tissues anywhere in the pulp, *develop* osteitis when hockey-stick incisions are added to the existing destruction. Hockey-stick incisions are bound to cut across what few vessels remain between healthy tissue and the volar surface of the phalanx, and I now regard the appearance of superficial pus near the midline as an absolute contra-indication to classical drainage. In these cases the volar scar is inevit-

able and, as other workers have already said, the volar drainage is usually adequate. Nearly all late cases are now treated by removal of cuticle, evacuation of pus and loose slough, and drainage of all infected spaces through the hiatus. I do not excise adherent slough.

I suspect, in fact, that any *unnecessary* incision increases the jeopardy in which the phalanx lies—e.g., the removal of nail because of redness and swelling of the nail fold—but I have insufficient cases (fortunately) to support me.

In this late type of case, which is so common a problem in our department, we consider the Kanavel incision definitely harmful. Previous writers have, I think, failed to emphasise this. Their condemnation applies to early cases, in which I think it may still have a place. My figures were as follows:

Condition and treatment	*No. of cases*	*Late osteitis*
Central sinus and hockey-stick or other incision	47	11 (23%)
Central sinus and local drainage	12	1 (9%)

CAVITATION

The discharge or release of pus, and the separation of slough, leave a cavity in the pulp space which fills with granulations and heals. We always have one or two patients attending with infection apparently overcome, and a clean cavity *lined* by granulations but reluctant to fill with them, having overhanging walls and often an area of viable bone also covered with granulations in its base. These cavities may persist for two or three weeks.

Gibbs (1948) states that delay in the collapse of cavity walls is due to penicillin therapy, which sterilises but does not dispose of the abscess and encourages delay in surgical drainage. In the present series by no means all the cases showing this delay had had penicillin. The problem is usually mechanical. The cavity is often held open by the healthy bone, rather than prevented from healing, as many suppose, by unhealthy bone in its base. It is sometimes held open by the nail, and cutting the nail as far back as possible helps in these cases. In most there is no answer, short of deliberately undertaking a plastic operation (a miniature "thoracoplasty"), which I hesitate to try. Occasionally, however, when first operating on extensive cavitation, or when performing sequestrectomy, such a delay may be anticipated, and, instead of making an incision, a *wedge* of superficial tissue may be excised to allow later collapse to take place. It must not be forgotten, however, that by far the greater number of cavities contract rapidly and heal quickly, and I use the word "occasionally" advisedly.

OTHER CASES

This series has not included private cases or cases among the nurses. Septic hands (except paronychia, which is no respecter of persons) are less common and show fewer complications in the professional than in the working classes. Perhaps the hands of professional people are less exposed to trauma (though this is less so nowadays; domestic occupations are common to all); but greater factors are the thinner horny layer, which allows small infections to swell, and earlier alarm at pain. I have not seen a pulp space develop osteitis in this class of patient in three and a half years, and I have not seen a case take longer than sixteen days to heal.

DELAY

The greatest single factor preventing further improvement in results is delay in attendance at the clinic. Only 18% of these patients attended within three days of onset of symptoms. Our records are by no means complete in this respect, but an attempt to find how much delay is due to the patient and how much to treatment, in general-practice surgeries, works first-aid posts, and in our own clinic, establishes that doctors or nurses are responsible for at least 16% of the delay. Some propaganda has been made outside, and more will be, but only the 16% is likely to be affected by it. I have noticed a high incidence of the "doctor (or nurse) made a nick" history in the osteitis cases, and blame the method mainly because it encourages further delay before seeking hospital treatment to see if the "nick" has done any good. The increasing use of penicillin in practice has the same effect. Undoubtedly many cases in general practice resolve successfully on penicillin therapy, but this may lead to longer delay in referring the ones that do not respond, and this is unfortunate.

It would be absurd to demand the immediate attendance of every pricked finger-end that has pain. Not only would the department be unable to deal with them, but it would lose the respect of the area. Yet advice must be precise. Any case suspected of early pulp-space infection should have a kaolin poultice applied, the whole hand put at absolute rest, and one's favourite "big" dose of penicillin. It must be seen again within twenty-four hours. If it is improved (and a reply from the patient to a question about pain is usually reliable evidence), treatment should be continued, and one should be guided by events. If it is no better it should be referred to the clinic forthwith.

DISCUSSION

These 438 cases (table II) are taken from a series of about 2700 septic hands seen in the clinic in three years. The total number of non-orthopædic non-dermatological hand conditions seen in this time was a little over 13,000. The pulp-space infection has been selected because it is the most important single condition demanding attention, but in such a condition, even with a comparatively large series, where incapacity for work can vary from three days to one hundred and thirty-three days, it is almost impossible to draw any reliable conclusions from the figures alone. The figures, though care has been taken, are only roughly reliable. As an instance, the 3 cases of

TABLE II—AVERAGE INCAPACITIES

Year	Treatment and time after onset	With osteitis		Without osteitis		Total	
		No. of cases	Days	No. of cases	Days	No. of cases	Days
1947	*Prompt incision:*						
	Early	2	40	20	20	22	22
	Late	13	53	73	23	86	28
	Unknown	4	56	21	29	25	33
	Conservative, ending in resolution:						
	Early	..	..	1	5	1	5
	Total	19	52	115	23	134	27
1948	*Prompt incision:*						
	Early	1	46	22	16	23	17
	Late	32	49	74	24	106	32
	Unknown	1	17	10	23	11	22
	Conservative, ending in resolution:						
	Early	..	..	7	6	7	6
	Conservative, with later incision:						
	Early	..	..	4	10	4	10
	Total	34	48	117	21	151	27
1949	*Prompt incision:*						
	Early	3	43	11	15	14	21
	Late	15	60	93	20	108	25
	Unknown	1	55	10	17	11	20
	Conservative, ending in resolution:						
	Early	..	..	7	7	7	7
	Late	..	..	6	8	6	8
	Conservative, with later incision:						
	Early	..	..	5	9	5	9
	Late	..	..	2	13	2	13
	Total	19	57	134	17½	153	22

osteitis in 1949 "seen within three days" were almost certainly late cases: 2 had a central sinus when first seen at the clinic, and the 3rd discharged a sequestrum four days after the first attendance. Cases of obvious defaulters have been omitted, though these include many who get a quick response to conservative treatment and do not come back to tell us so. (We lose many splints and slings!) To include them would brighten the picture considerably but unjustifiably. Those who do not attend for their official discharge after a reasonable course of treatment have been counted up to their last attendance. One patient for whom, on his sixteenth day, a dry dressing had been prescribed for three days, next appeared on his thirty-seventh day. He was assessed on the full period, though he had probably been healed a fortnight earlier.

With these sources of error—and they must occur in all clinics if a long enough period is reviewed—I cannot understand how a few days' difference in the results can be attributed to any particular alteration in details of treatment—even including the use of penicillin. Moreover, the descent of a surgical team on a casualty department for a limited period of time, with the consequent renaissance of enthusiasm and supervision of dressing technique, will produce an improvement in results whatever the "object of the exercise."

I do think it significant, however, that there has been a progressive reduction in length of treatment for the non-osteitis cases (from 23 days in 1947 to 17½ in 1949), and that no case of massive necrosis has occurred in the course of treatment since 1948. I attribute these improvements to a tendency to treat each case on its merits instead of all cases by a routine. There is no doubt also that penicillin in the early cases, with an increased adoption of the conservative approach, has contributed; but we have tried intensive penicillin therapy for osteitis cases along the lines laid down by Bolton et al. (1947) with less successful results. All their cases were healed within eight weeks, but every few months we are defeated by an isolated case which jolts our averages far out of their prescribed orbits.

The conservative treatment has a definite rôle, but it applies only to a minority of the cases in this area, and is fraught with danger to the inexperienced. The vast majority of patients attend too late for it, and in these cases, particularly, I believe improvement can be obtained by the abandonment of classical incisions.

I am still concerned about delay (often up to three weeks) in seeking treatment, and I aim at eliminating all cases of osteitis which cannot be directly attributed to this delay. Until this delay is eliminated, there will always be a hard core of refractory cases.

SUMMARY

The results published by various teaching clinics on the treatment of septic hands excite the admiration of surgeons elsewhere, but must be regarded as a goal rather than a standard for the country as a whole.

The results obtained in three years in a provincial casualty department are reported, with particular reference to infection of the digital pulp space. The average delay in seeking treatment is greater than that reported by other workers, and osteitis is a formidable problem. Measures are recommended to reduce the incidence of osteitis of the phalanx resulting from pulp-space infection.

It is suspected that much osteitis is caused by too rigid adherence to classical incisions. The latter is nevertheless recommended for *early* pulp-space infections not responding within 24 hours to conservative treatment.

One acknowledgment makes all others relatively unimportant; it is to the casualty officers and to Sister E. L. Bolam and her staff, quite inadequate in numbers, miraculously adequate in effect. They give over 40,000 services a year, in a room 24 ft. square. In the rush of it all they yet find the extra moments necessary to give a septic hand that skilful attention which makes all the difference.

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ÆTIOLOGY OF CHRONIC GASTRIC ULCER

OBSERVATIONS ON THE BLOOD-SUPPLY OF THE HUMAN GASTRIC MUCOSA WITH A NOTE ON THE ARTERIOVENOUS SHUNT

F. S. A. DORAN
M.D. Camb., F.R.C.S.

LATE SURGICAL CHIEF ASSISTANT, CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE, MANCHESTER, AND CLINICAL DEMONSTRATOR IN ANATOMY, MANCHESTER UNIVERSITY

WHEN, in the last century, Virchow advanced his vascular hypothesis to explain the formation of chronic peptic ulcers he regarded it as being of fundamental importance, although he did not consider it to be the only factor at work in this condition. In his view, the essential feature in the production of these ulcers was a vascular infarction of part of the mucosa, due to thrombosis, arteriosclerosis, spasm, or embolic occlusion, the resulting area of necrosis being then digested by the acid gastric juice. This idea derived some support from the demonstration by Reeves (1920) that in the lesser curvature of the stomach the submucous plexus was composed of very small arteries with few anastomoses, unlike those existing in the rest of the stomach, and that the branches of this plexus supplying the mucosa were arranged in a manner that predisposed to thrombosis. In recent years, however, the importance of this concept of the cause of peptic ulceration has steadily diminished. Now, overshadowed by the neurogenic and chemical hypotheses, it attracts little attention. This decline in the status of Virchow's hypothesis is attributable not only to the increasing mass of evidence in favour of the neurological and chemical factors but also because it is closely linked with the idea that the ulceration is preceded by infarction.

Much experimental work has been based upon this concept of an infarct, as McCann's (1929) review shows, but the results weakened rather than strengthened the idea. A remarkable assortment of substances, including mycotic emboli and tobacco, have been injected into the blood-vessels of the stomach in laboratory animals to produce infarction; but even when ulceration resulted all the lesions healed in about three weeks. Moreover no firm support was produced from the various ligation experiments, or from those which sought to bring about areas of mucosal ischæmia by means of vascular spasm (McCann 1929). More damaging still was the demonstration by Mann and Bollman (1932) that the chronic peptic ulcers which result experimentally from the diversion of the duodenal contents into the terminal ileum (Mann and Williamson 1923), and which are identical with those occurring clinically, begin not as an infarct but as a saucer-like depression on the surface of the mucosa. Nevertheless a modified vascular hypothesis, freed from the concept of infarction, could still be of value in helping to explain the situation of a chronic peptic ulcer, particularly in the stomach, and the recent work of Barclay and Bentley (1949) is a step in this direction.

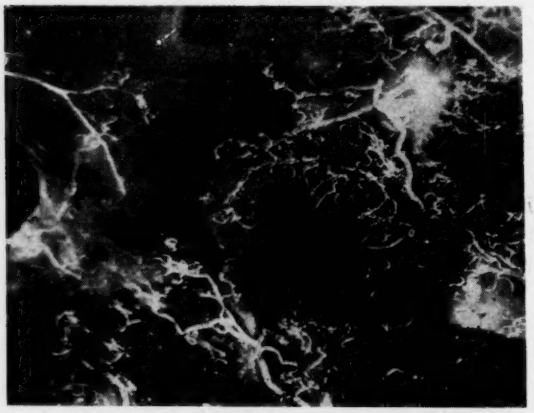

Fig. 1—Microradiograph showing the vascular density of the mucosa on the lesser curvature of the stomach.

METHOD

The technique employed in the present study was the radiological one devised by Barclay (1947). The contrast medium used to demonstrate the arterioles and finer vessels, with which this investigation is alone concerned, was a colloidal suspension of 10% silver iodide (Barclay and Bentley 1949) injected with a syringe through a hypodermic needle tied into a convenient artery, usually the right gastro-epiploic, the small bore of such a needle being found to act as a convenient safeguard against the development of too great a pressure. The mercury manometer and pressure chamber used in the preliminary trials were therefore discarded as being unnecessary.

The material consisted of portions of sixteen stomachs removed during partial gastrectomy in the treatment of chronic peptic ulceration. Ten were done under general and six under epidural anæsthesia. In four instances the lesion was a gastric ulcer, the remainder being duodenal ulcers.

The injection was always made as soon as possible after the specimen had been removed. In most instances the delay was three or four hours; in two instances the injection was performed within an hour, and in a few the delay was twelve hours.

To obtain adequate filling of the arterial system it was found necessary not only to ligature all points of leakage along both curvatures but also to oversew the cut end of the stomach from which leakage was otherwise very free.

The injection was continued until a slight resistance was encountered. Then the specimen was radiographed to confirm that the filling of the arterial system was satisfactory. The next step was to slit the stomach longitudinally down its anterior wall midway between the greater and lesser curvatures. The specimen was opened out flat and radiographed. This second film was then examined with a magnifying glass, suitable areas were selected, the corresponding pieces were excised from the stomach, and microradiographs were made of them.

Although in the preliminary trials an attempt was made to wash all the blood out of the vessels with saline solution before the contrast medium was injected, this step was not taken in any of the twelve specimens radiographed in this series.

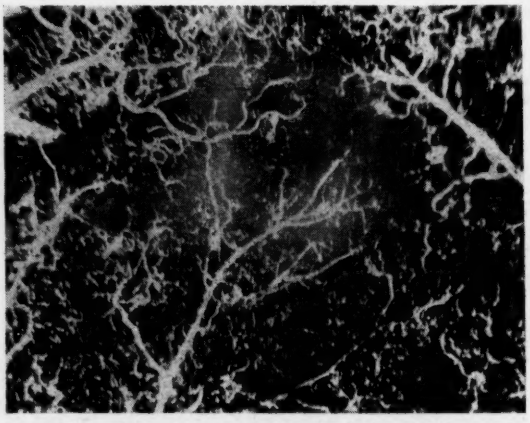

Fig. 2—Microradiograph showing the vascular density of the mucosa on the greater curvature of the stomach.

The four specimens used to demonstrate the arteriovenous shunt, however, were treated in a different manner, the technique of intravascular hæmatoxylin advocated by Grant (1930b) being used.

Fig. 3—Microradiograph of vertical section 100 μ thick through edge of large chronic gastric ulcer, showing vascular pattern.

MUCOSAL BLOOD-SUPPLY

The vessels which supply the gastric mucosa arise from a rich plexus in the submucosa. Their behaviour as they course towards the subepithelial layer of the mucosa, and their relationship to the gastric glands, have been known for a hundred years. This is proved by Arnold's diagram made in 1847 and reproduced by Latarjet (1931). A good description is given also by Jonnesco and Soulié (1912). These accounts are confirmed by the present study.

The vessels originating from the submucous plexus penetrate the muscularis mucosæ and immediately divide into two main branches at

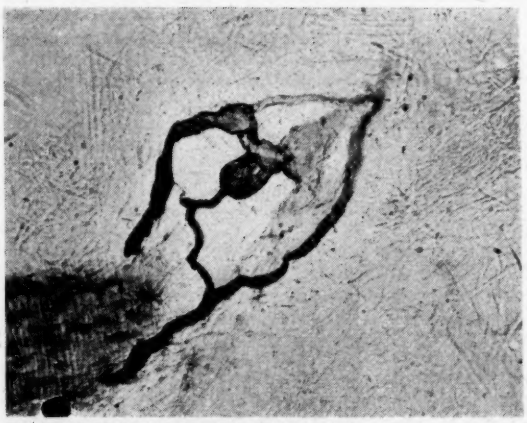

Fig. 4—Histological section 100 μ thick showing an arteriovenous shunt with the characteristic sudden enlargement in lumen of the anastomotic channel. (Intravascular hæmatoxylin.)

right angles to the parent stem. These branches run longitudinally parallel to the muscularis mucosa which they have just pierced. The extremities of these branches anastomose with those springing from the neighbouring vessels of the same kind. From this longitudinal arcade, lying just on the mucosal side of the muscularis mucosa, numerous vertical arterioles arise which penetrate the thickness of the mucosa to reach the subepithelial layer. These arterioles are of three types: (1) long straight vessels varying somewhat in calibre and without branches; (2) vessels showing one primary division; and (3) a short vertical stem which breaks up into a moderately complex series of arborisations.

From the ends and sides of these arterioles numerous capillaries arise which anastomose with similar vessels from neighbouring arterioles to form a rich plexus throughout the whole thickness of the mucosa. The system of vascular anastomoses which exists in the substance of the mucosa, as opposed to the intercommunicating vascular arcade lying on the muscularis mucosa, is composed of capillaries. Anastomoses between the arterioles are not common, a point which has been emphasised by Latarjet (1931).

The relationship of these arterioles and capillaries to the tubular glands of the body of the stomach is a simple one. The arterioles run parallel to, and in between, the glands. Most of the glands, however, are supplied by two

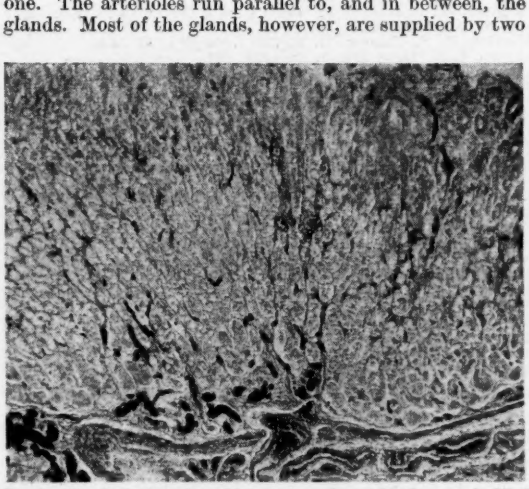

Fig. 5—Histological section of injected specimen showing poorly filled area of mucosa (× 33).

or three capillaries originating from the arterioles and placed in the reticular tissue connecting the glandular tubules together; these capillaries also run parallel to the glands and are interconnected by short channels at right angles to the long axis of the tubule.

DENSITY OF DISTRIBUTION OF BLOOD-VESSELS SUPPLYING GASTRIC MUCOSA

Possibly the formation of a chronic gastric ulcer is due in part to the chemical action of the acid gastric juice upon a piece of mucosa whose total vascularity makes it unable to withstand that action. Several specimens in the present series support this idea that the lesser curvature has fewer vessels per square inch of mucosal surface than has the greater curvature. This point is illustrated by figs. 1 and 2, which are microradiographs of mucosa from the lesser and greater curvatures respectively of a stomach resected because of a gastric ulcer. In each case the mucosa has been dissected off the muscular coats and spread out flat upon an X-ray plate so that the vascular density in the same plane as the mucosal surface is shown. This lower density is not evident in a section at right angles to the mucosal surface, even at the edge of a large gastric ulcer (fig. 3). It is of particular interest to note that in cases of duodenal ulcer the vascular

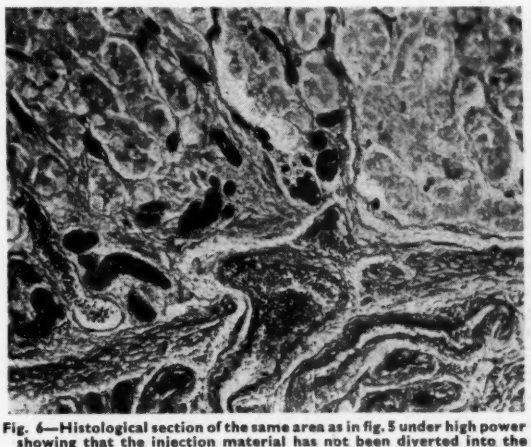

Fig. 6—Histological section of the same area as in fig. 5 under high power showing that the injection material has not been diverted into the vein passing through the muscularis mucosæ (× 78).

density of the lesser curvature tends to be the same as that of the greater.

FACTORS INFLUENCING THE MUCOSAL BLOOD-SUPPLY: RÔLE OF ARTERIOVENOUS SHUNT

If, in addition to a lower vascular density of the ulcer-bearing area of the stomach, this region is exposed to the operation of other factors tending to diminish its blood-supply, the vascular hypothesis would be strengthened further.

It has been suggested (Barclay and Bentley 1949) that the blood-supply of the gastric mucosa can be cut off completely by the opening of arteriovenous shunts in the submucosa, the ætiological significance of which has been noted by Alvarez (1949). He even suggested that the correct line of surgical treatment for chronic gastric ulceration would be the denervation of the shunts to prevent them from opening.

The existence of an arteriovenous shunt was doubted for many years, even after they had been demonstrated histologically, as the historical reviews (Clark 1938, Boyd 1939) of the subject show. Now they have been definitely established, and their presence proved in several organs and tissues. They were first seen in vivo by Grant (1930b). Recently, however, they have been

found in the stomach wall (De Busscher 1948, Barlow 1950), and an example from the present series is shown in fig. 4.

If the future treatment of chronic gastric ulceration is to be based upon the denervation of the shunts, the properties of their nervous control must be studied. The view has been expressed (Barclay and Bentley 1949) that they are supplied by the sympathetic and opened by its stimulation. This opinion resulted from an inference based on the observation that, if the gastric resection was performed under general anæsthesia, leaving the sympathetic pathway open to convey the efferent side of a reflex initiated in the abdominal parietes, the injection material did not enter the mucosa. Conversely, if the efferent sympathetic path was blocked by a spinal anæsthetic, the injection medium passed freely into the mucosal vessels. This observation, however, has not been confirmed by the present study, in which no definite correlation was found between the mucosal filling and the type of anæsthetic, as follows:

Case no.	*Mucosal filling*	*Anæsthetic*
1	Good	General
2	Poor	Epidural
3	Quite good	Epidural
4	Good	General
5	Good	General
6	Poor	General
7	Quite good	General
8	Moderate	General
9	Moderate	Epidural
10	Poor	General
11	Quite good	General
12	Moderate	General

The best mucosal filling was obtained in a specimen removed under general anæsthesia. Moreover, although the shunt mechanism is known to be under powerful sympathetic control, it has been demonstrated by Grant (1930b) that sympathetic stimulation closes the shunts. Another difficulty in the way of attributing mucosal filling defects to the opening of an arteriovenous shunt is Grant's (1930b) observation that, when the shunt opens, a reflux flow of blood to the periphery occurs distal to the opening of the anastomotic channel. This is of importance, especially as regards the stomach, because its veins, being part of the portal system, are devoid of valves. Some of the injection material might therefore be expected to pass through the shunt and backward up the veins into the mucosa. This retrograde pathway could not be detected in a microradiogram. It is, in fact, very difficult to differentiate between arterioles and venules even histologically. Grant's (1930a) study of the factors determining the calibre of the small peripheral branches of the arterial tree make it more probable that these mucosal filling defects are due to local vascular spasm caused by direct pressure and the action of a product of tissue damage. To resect a stomach without bringing these factors, whose effect is independent of the nervous system, into play in various degrees is unlikely. Furthermore, technical artefacts are certain to occur. If the filling defects were due to a shunt, the diverted injection material should be found in the appropriate veins; but, as figs. 5 and 6 show, this evidence was not found.

Lastly, the number of shunts needed to achieve an extensive diversion of blood from the mucosa would be large, unless they were of great size. The present series, however, suggests that they are neither numerous nor large; and De Busscher's (1948) findings agree with this opinion. Nor is there any evidence that they are confined to, or are more numerous in, the ulcer-bearing area.

CONCLUSIONS

The lower vascular density of the lesser curvature of the stomach is probably one of the factors responsible for the observed localisation of chronic gastric ulceration to this region.

The ætiological significance which has been predicted for the arteriovenous shunt mechanism is premature.

SUMMARY

The importance attached to the vascular component in the ætiology of chronic gastric ulcer has steadily diminished in recent years, and the reasons for this decline are given.

The vascular hypothesis may still be of value if it can be shown that the ulcer-bearing area contains certain peculiarities.

The material studied, the radiological method used, and the contrast medium injected into the arterial tree are described.

Microradiographs show the lower vascular density of the mucosa from the lesser curvature.

The technical difficulties inherent in the method are discussed; and it is shown that deductions based on radiological filling defects are open to criticism.

An example of an arteriovenous shunt in the stomach wall is given. Its ability to divert the injection material from the mucosa is discussed.

I wish to thank Prof. G. A. G. Mitchell for his help in the preparation of this paper, Prof. J. Morley, Mr. R. L. Newell, Mr. R. L. Holt, Mr. G. O. Jelly, and Mr. W. A. B. Nicholson for an ample supply of specimens, Mr. F. L. Newell and Mr. K. Pearson, for their highly skilled technical assistance, and Mr. H. Gooding and Mr. P. Howarth for the photographs. The expenses of the investigation were partially defrayed from a Medical Research Council departmental grant.

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THE ELECTROPHORETIC SERUM-PROTEIN PATTERN IN MALIGNANT MALNUTRITION

C. G. ANDERSON
Ph.D. Birm., Dip. Bact., A.R.I.C.
OF THE SERUM DEPARTMENT, SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH, JOHANNESBURG

The late A. ALTMANN
M.D. Berlin, M.D. Witwatersrand, L.R.C.P.E., D.T.M. & H.
OF THE DEPARTMENT OF PÆDIATRICS, BARAGWANATH NON-EUROPEAN HOSPITAL, JOHANNESBURG

WE report here the results of an electrophoretic examination of the sera of patients suffering from malignant malnutrition (kwashiorkor, infantile pellagra), taken at various stages from the beginning to the end of treatment and at various times after recovery. The work is part of a larger study of the clinical, histological, and biochemical aspects of malignant malnutrition which will be reported in due course. The anæmia involved has already been described by Altmann and Murray (1948).

METHODS

The blood samples were drawn from the fontanelle and allowed to clot. The serum was separated, and the specific gravity determined by the copper sulphate method. The protein content was calculated from the specific gravity, using the formula $P = 364\ (G_p - 1{\cdot}0060)$ where P is the amount of protein in grammes per 100 ml. of serum and G_p is the specific gravity, given by Hoch and Marrack (1945).

Serum samples were appropriately diluted in phosphate buffer, pH 7·5 and $\mu = 0{\cdot}1$, and dialysed against the same buffer solution until equilibrium (as determined by change in refractive index) was reached; 24–48 hours in the refrigerator at about 4°C was usually adequate. The electrophoresis runs were made in the Tiselius apparatus at 1°C with 10 mA at a potential gradient of approximately 4·5 V per cm. The photographic records were enlarged five times by projection, the curves traced, and the areas corresponding to the different components measured with a planimeter, and the proportion of each component in the whole serum was calculated. The averages of values determined for both ascending and descending columns at two or three time intervals were used. The absolute amount of each component was calculated from the proportion and the known total protein content of the serum.

ELECTROPHORETIC COMPONENTS OF SERA FROM CASES OF MALIGNANT MALNUTRITION AND NUTRITIONAL ŒDEMA

Case	Date	Specific gravity (sp.gr.)	Total protein from sp.gr. (g./100 ml.)	Proportion of total (%)				Absolute amount of components (g./100 ml.)					Ratio		Notes
				Albumin	Globulins α	Globulins β	Globulins γ	Albumin	Globulins α	Globulins β	Globulins γ	Globulins Total	Alb. glob.	Alb. γ-glob.	
Malignant Malnutrition															
1	Sept. 17, '48	1·020	5·1	50·9	13·0	14·2	22·0	2·60	0·66	0·72	1·12	2·50	1·04	2·32	Discharge specimens
2	Apr. 19, '49	1·0265	7·5	53·3	14·6	11·5	20·5	3·99	1·09	0·86	1·54	3·49	1·14	2·59	
3	Dec. 15, '48	1·0165	3·8	40·9	15·8	8·6	34·7	1·56	0·33	0·60	1·32	2·25	0·69	1·18	Fatal
	1949														
4	Jan. 26	1·025	6·9	50·8	9·7	14·4	25·3	3·50	0·67	1·00	1·75	3·40	1·03	2·00	
5	Feb. 2	1·026	7·3	45·1	10·1	16·8	28·2	3·30	0·74	1·23	2·06	4·03	0·82	1·60	Discharge specimens
6	Apr. 25	1·026	7·3	51·3	14·0	14·3	20·3	3·74	1·02	1·05	1·48	3·55	1·06	2·50	
7	Apr. 25	1·0315	9·3	34·5	12·5	12·9	40·1	3·21	1·16	1·20	3·73	6·09	0·53	0·86	
8	July 14	1·016	3·6	32·5	16·5	22·0	29·1	1·17	0·59	0·79	1·05	2·43	0·48	1·11	Fatal
9	Jan. 13	—	8·0*	37·2	10·3	13·9	38·2	2·98	0·83	1·12	3·07	5·02	0·59	0·97	—
„	July 1	1·027	7·6	46·7	11·1	13·8	28·4	3·55	0·85	1·05	2·06	4·05	0·88	1·72	Follow-up
„	Nov. 17	1·027	7·6	53·8	9·1	12·6	24·4	4·09	0·69	0·97	1·86	3·51	1·16	2·20	
10	Apr. 13	1·016	3·6	29·6	12·5	20·8	35·0	1·07	0·45	0·75	1·26	2·46	0·43	0·85	
„	Apr. 28	1·020	5·1	39·8	8·3	12·7	39·2	2·03	0·42	0·65	2·00	3·07	0·66	1·01	
„	May 9	1·0255	7·1	43·1	11·6	15·5	29·8	3·06	0·82	1·10	2·12	4·04	0·76	1·44	
11	May 3	1·020	5·1	42·9	12·9	15·4	28·9	2·19	0·66	0·79	1·47	2·92	0·75	1·49	
„	May 20	1·0275	7·8	47·4	10·5	13·9	28·2	3·69	0·82	1·08	2·20	4·10	0·90	1·68	
12	June 14	1·017	4·0	38·6	17·8	17·5	26·1	1·55	0·71	0·70	1·05	2·45	0·63	1·48	Serial specimens
„	June 24	1·020	5·1	36·8	10·9	18·2	34·1	1·88	0·55	0·93	1·74	3·22	0·58	1·08	
„	July 20	1·027	7·6	45·9	13·9	16·0	23·9	3·49	1·06	1·22	1·82	4·11	0·85	1·92	
13	June 25	1·017	4·0	44·0	14·0	15·3	26·3	1·76	0·56	0·61	1·05	2·24	0·79	1·67	
„	July 8	1·023	6·2	43·2	9·3	17·0	30·2	2·68	0·58	1·06	1·82	3·52	0·76	1·47	
„	July 26	1·026	7·3	59·0	5·9	11·4	23·7	4·31	0·43	0·83	1·73	2·99	1·44	2·49	
Nutritional Œdema															
14	Feb. 28	1·0285	8·2	51·4	10·5	16·6	21·5	4·21	0·86	1·36	1·76	3·98	1·06	2·39	
15	Apr. 12	1·024	6·6	32·7	9·8	19·1	38·4	2·16	0·65	1·26	2·53	4·44	0·49	0·85	
16	Mar. 9	1·025	6·9	49·6	10·6	17·6	22·2	3·43	0·73	1·22	1·53	3·48	0·99	2·24	Discharge specimens
17	Mar. 23	1·0285	8·2	46·8	8·0	19·4	25·8	3·83	0·65	1·59	2·12	4·37	0·88	1·81	
18	Mar. 11	1·025	6·9	56·4	4·1	14·9	24·7	3·89	0·28	1·03	1·71	3·02	1·28	2·28	
19	Apr. 4	1·027	7·6	45·4	12·9	15·8	26·2	3·45	0·98	1·20	1·99	4·17	0·83	1·73	
20	Apr. 7	1·018	4·4	54·6	13·0	10·3	22·1	2·41	0·57	0·45	0·97	1·99	1·21	2·48	
„	Apr. 20	1·023	6·2	44·9	18·7	14·0	22·4	2·78	1·16	0·87	1·39	3·42	0·81	2·01	
21	Apr. 9	1·0165	3·8	46·7	21·7	9·1	22·5	1·78	0·82	0·35	0·86	2·02	0·88	2·07	Serial specimens
„	Apr. 21	1·022	5·8	39·6	13·0	29·0	18·4	2·30	0·75	1·68	1·07	3·50	0·66	2·15	
„	Apr. 28	1·026	7·3	50·4	9·7	14·7	25·2	3·68	0·71	1·07	1·84	3·62	1·02	2·00	
22	July 15	1·020	5·1	46·3	17·5	13·4	22·9	2·36	0·89	0·68	1·17	2·74	0·86	2·01	
„	July 30	1·028	8·0	45·3	7·5	17·1	30·1	3·62	0·60	1·37	2·41	4·38	0·83	1·50	
Normal	Mean		7·2	63·1	11·4	11·7	13·2	4·55	0·82	0·84	0·95	2·65	1·72	4·80	
	Range		6·5–8·0	59–72	6·2–15·0	11·3–17·1	8·8–16·0	4·0–5·7	0·4–1·2	0·7–1·4	0·6–1·3	1·7–3·9	—	—	—

* Nitrogen estimated by Kjeldahl method.

RESULTS

The values obtained for sera from 13 cases of malignant malnutrition and from 9 cases of nutritional œdema are given in the table. The "normal" values quoted are the mean of many such values given in the literature. Lubschez (1948) found that the mean values given by electrophoresis of sera from normal children were about the same as those for adults, although the range was considerably greater.

DISCUSSION

It can be seen that the serum-protein value is low at the time of admission to hospital, as previously reported by Trowell (1944), Gillman and Gillman (1945), and Altmann (1948), and rises during the course of treatment on a diet with a high protein intake. A normal total serum-protein content is reached in three to four weeks, in which time clinical recovery also occurs. The outstanding features of the protein pattern in malignant malnutrition are the low absolute and relative amounts of albumin compared with normal values, and the high absolute and relative amounts of γ-globulin. Even on admission to hospital when the total protein is at its lowest level the amount of γ-globulin is almost always higher than normal. As the normal serum-protein level is restored both albumin and globulin rise. Usually the amount of albumin in the serum at the time of clinical cure is somewhat below the normal average but the amount of γ-globulin is almost invariably higher. That this abnormal state may persist for some time is shown by case 9. On discharge as clinically cured this patient had 2·98 g. of albumin, and 3·07 g. of γ-globulin, per 100 ml. of serum. On readmission to hospital six months later for follow-up study, the values were 3·74 g. and 2·27 g. Twelve months after cure the albumin content was 4·09 g., and the γ-globulin content 1·86 g., per 100 ml. This patient's serum also showed, on all three occasions, the positive thymol turbidity and flocculation reaction often found in cases of malignant malnutrition during the recovery phase,[1] which is normally associated with an increase in the γ-globulin content of the serum (Maclagan 1948, Wunderly and Wuhrmann 1947). He was clinically well and had been on a satisfactory diet in an institution during the twelve months since his original discharge from hospital. The explanation and significance of these observations are not yet clear, particularly in relation to possible liver damage.

The α-globulin content of the sera is usually not far from normal and the same applies to β-globulin, although here the tendency is for the value to be on the high side of the normal average.

These findings are very much like those reported by Martin (1949) for sera from patients with progressive uncomplicated cirrhosis of the liver. Here, too, the serum-albumin is low and the γ-globulin content very high, and accompanied by a strong thymol turbidity reaction. In clinically cured cases of malignant malnutrition, however, liver biopsy specimens do not show signs of early cirrhosis.

It will be seen from the table that there is no essential difference between the values found for the sera of patients suffering from nutritional œdema and those with the additional signs of the syndrome of malignant malnutrition. This similarity affords support for the opinion of Altmann (1948) and of Waterlow (1948) that malignant malnutrition is primarily a result of protein deficiency and that the manifestations of vitamin deficiency are only incidental. Further evidence of this is given by Hottinger et al. (1948), who state that concentration-camp inmates suffering from "hunger disease" had low serum-albumin content, approximately normal α- and β-globulin contents, and high γ-globulin content, the values being very similar to those found in the present work. These workers go so far as to define "hunger disease" as "hypoalbuminæmia with dysglobulinæmia." The sera from their patients gave a positive Takata reaction, analogous to the thymol tests in this series.

1. A paper describing the correlation of liver function and thymol tests is in preparation (Altmann and Bersohn).

SUMMARY

The electrophoretic examination of sera, taken at various stages during treatment, from Bantu children suffering from malignant malnutrition or from nutritional œdema has shown that, although on admission to hospital the total serum-protein content is much below normal values, the amount of γ-globulin is both absolutely and relatively normal or higher than normal. The albumin content is much reduced whilst the values for α- and β-globulins are about normal. After clinical cure the albumin content of the serum is usually still below normal and the γ-globulin considerably above normal. The abnormal γ-globulin content may persist for at least a year with the patient in good condition and on an adequate diet. These findings are similar to those found in adults with "hunger disease" and therefore link malignant malnutrition to the hunger œdema of adults.

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UNIOVULAR TWINS SHOWING GROWTH DISPARITY DUE TO RENAL DWARFISM

M. D. MILNE
M.B., B.Sc. Manc., M.R.C.P.
CHIEF ASSISTANT, DEPARTMENT OF MEDICINE, UNIVERSITY OF MANCHESTER

UNIOVULAR or co-called "identical" twins are generally very similar both in appearance and size. In a biometric study of more than five hundred members of twin pairs Stocks (1930) defined the differences in size to be expected in pairs of uniovular twins; he considered that "a difference in height exceeding the standard deviation of height appropriate to the age of the pair almost certainly excludes monozygotism."

Greater disparity in size is, however, occasionally encountered as a result of chronic disease or deformity in one of a monozygotic pair; but very few such cases are recorded, presumably because disease greatly influencing growth is likely to affect both twins simultaneously. The case described here is of interest both because of the considerable disparity in growth and as an example of renal dwarfism of developmental ætiology.

CASE-RECORD

A boy, aged 13, was referred to the Manchester Royal Infirmary because of polydipsia, polyuria, nocturnal enuresis, and dwarfism. He was one of a family of five, three boys and two girls, and had a twin brother. The parents and siblings all appeared healthy. The patient had been considerably smaller than his twin brother at birth, their respective weights being 3 lb. and 4½ lb. This disparity had persisted throughout childhood, and the patient had always been somewhat retarded in development. He had always drunk an excessive quantity of fluid as long as the parents could remember, and had been late in gaining diurnal control of micturition. Nocturnal control he had never attained, and he invariably wet the bed at night. There seemed to be

relatively little intellectual impairment, although he was poor at reading and writing, partly because of intermittent and often half-time school attendance.

On examination he was clearly dwarfed, his height being 50 in., the mean height for his age being 59½ in. (standard deviation 3·1 in.). His weight was correspondingly reduced to 50 lb., the mean weight for his age being 89 lb. (S.D. 16½ lb.). There was, however, no evidence of rickets or other deformity, and the dwarfing was perfectly symmetrical. The heart and lungs were normal, and the blood-pressure was within normal limits, being 120/70 mm. Hg. No abnormal masses were palpable in the abdomen; there was no evidence of renal enlargement or vesical distension. The urine was pale, sp. gr. 1·010, and contained a moderate amount of albumin. The average volume of urine voided in twenty-four hours was about 1500 ml; there was complete isosthenuria, sp. gr. remaining at 1·010 despite restriction of fluids. The average protein content of the urine (Esbach) was 1·5 g. per litre. There was considerable retention of nitrogen, the blood-urea level being 114 mg. per 100 ml.; the urea-clearance was only 13% of the average normal. The urine contained no pus cells or erythrocytes, but a few granular casts were present; it was sterile on culture. The serum-calcium was 9 mg., the inorganic phosphorus 5 mg., the alkaline phosphatase 27 King-Armstrong units, and the alkali reserve 51 c.cm. CO_2 per 100 ml. Radiography of the epiphyses showed no evidence of rachitic change, and radiography of the abdomen was normal, there being no sign of urinary calculus or other abnormal opacity.

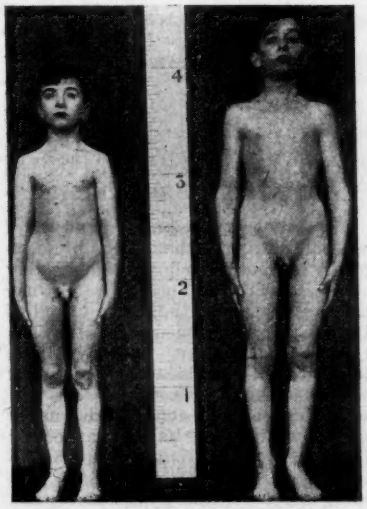

Fig. 1—Patient (left) and uniovular twin (right). (Scale in ft.)

DIAGNOSIS

The diagnosis was clearly renal dwarfism due to chronic renal insufficiency without secondary hypertension. This may cause the well-known triad of dwarfism, renal rickets, and infantilism, but in this case there was no evidence of rickets and the boy was too young to decide whether there would be secondary infantilism.

This type of chronic renal failure in childhood is usually due either to chronic atrophic pyelonephritis or to chronic urinary obstruction, which may result from a congenital valve in the posterior urethra (Ellis and Evans 1933); rarer causes are latent glomerulonephritis and bilateral polycystic disease of the kidneys (Rule and Grollman 1944). On clinical grounds it was considered that chronic atrophic pyelonephritis was the most likely cause of the renal failure in this patient, despite the lack of evidence of urinary infection. Such cases of chronic pyelonephritis are often superimposed on some congenital anomaly of the upper urinary tract (Erb and Summerfeldt 1941). Unfortunately this cannot be demonstrated by intravenous pyelography in patients with gross reduction of renal function, because the kidneys do not concentrate the contrast medium sufficiently to give a satisfactory shadow. Retrograde pyelography can be used, but it is a comparatively major procedure for an investigation which can only be regarded as of academic interest, and can occasionally lead to a serious or even fatal urinary infection in such cases. It was therefore regarded as unjustifiable in the present case, especially since relevant information was available from examination of the normal twin.

COMPARISON OF THE TWINS

The patient's twin appeared to be a normal boy of 13 although somewhat smaller than the average. His height was 56¼ in. and weight 67 lb. He had no polydipsia, polyuria, or nocturnal enuresis; his urine did not contain albumin, and the specific gravity of a morning specimen was 1·026. The blood-urea was normal, being 26 mg. per 100 ml.

Despite the obvious difference in size it was considered that the twins were uniovular. They were compared by the method described by Newman (1940) and, except for their unequal growth, were found to be strikingly similar (figs. 1 and 2). Their hair was of the same colour, texture, and distribution; their eyebrows and eyelashes were almost exactly alike; their eyes were of the same colour; both twins had a congenital partial ptosis of the left eyelid; their ears were of the same shape; their teeth were much alike (but the patient's were more crowded because of his smaller jaws); their palm and fingerprints showed considerable points of similarity; the two boys had a livedo reticularis of the legs of identical distribution; and the blood-groups of both were O, R 2, MN, S-negative, P-positive, Lewis-negative, and Lutheran-negative.

There therefore seems to be no reasonable doubt that the twins were uniovular. It was consequently a reasonable assumption that if the patient had a congenital renal lesion it would also be present in his twin brother. It was readily demonstrated in the twin brother by intravenous pyelography, a method inapplicable in the patient because of his renal insufficiency. Dr. E. D. Gray reported on the intravenous pyelogram (fig. 3) as follows:

> "Neither kidney is enlarged, and both appear to be excreting diodone normally. Both kidneys have a pelvis which is largely extrarenal. The left renal pelvis is considerably larger than the right. The minor calices are smaller and more numerous than average, and, except in the upper poles, arise directly from the pelvis. It is difficult to define the pelvi-ureteric junction on either side. The somewhat unusual appearance of the upper urinary tract can be classed as a variant of the normal."

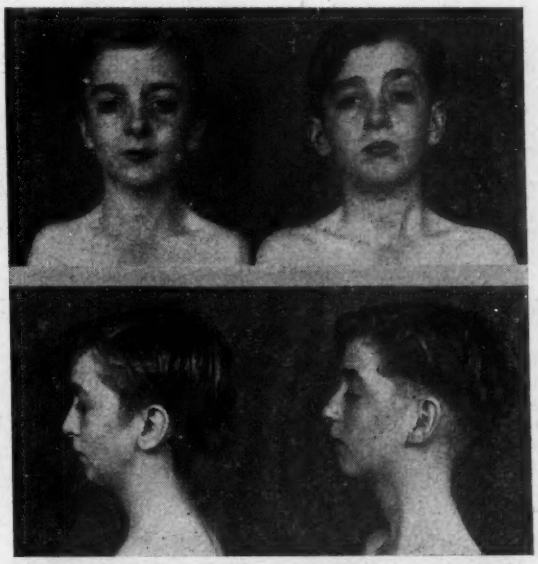

Fig. 2—Full-face and profile views of patient (left) and twin (right).

It is postulated that a chronic pyelonephritis has been superimposed on similar renal pelves in the patient; but no explanation is offered as to why this has happened in the patient and not in his twin.

DISCUSSION

Few examples of such unequal growth in uniovular twins are recorded. Siemens (1927) described female uniovular twins very different in height owing to scoliosis in one of them. A similar case of kyphoscoliosis in one of male uniovular twins is described by Lehmann (1937). Lewis (1936) described a case of much disparity due to gigantism and acromegaly in one of uniovular twins. An interesting example in Japanese male uniovular twins is recorded by Komai and Fukuoka (1934):

> One of the twins developed polydipsia, polyuria, and dwarfism at the age of 6 years. This was diagnosed as due to diabetes insipidus, but unfortunately the medical details are inadequately described. The only evidence given in favour of the diagnosis is a disparity in size between their sellæ turcicæ; but as the smaller sella turcica was in the smaller twin this evidence can hardly be regarded as relevant. A diagnosis of diabetes insipidus would not now be accepted without either evidence of satisfactory response to treatment with pituitary extract or a negative response to the intravenous hypertonic saline test described by Hickey and Hare (1944). Neither of these criteria was applied in this case. Nor does diabetes insipidus in childhood lead to dwarfing unless it is secondary to cerebral tumour, xanthomatosis, or diencephalic encephalitis (Warkany and Mitchell 1939). No evidence was given of any of these conditions in the affected twin. No tests of renal function seem to have been made, and in fact there is nothing in the published description against a hypothesis that the true diagnosis was renal dwarfism as in the present case.

The growth disparities recorded in these cases are summarised in the accompanying table.

Many cases of renal rickets and dwarfism, or lesions likely to cause this, have previously been described in siblings. The cases published before 1930 have been reviewed by Mitchell (1930), who lists 11 instances of renal dwarfism or rickets in which more than one member of the family was affected. Davidsohn and Newberger (1933) described twins, presumably uniovular, who died on the seventeenth and nineteenth days of life from uræmia due to congenital valves in the posterior urethra.

Fig. 3—Intravenous pyelogram of patient's twin brother.

Reference	Diagnosis	Sex	Age (years)	Height (cm.)		S.D. appropriate to age (cm.)	Growth disparity as multiple of S.D.
				Of shorter twin	Of normal twin		
Siemens (1927)	Scoliosis	F	16	142·0	154·0	5·75	2·1 ×S.D.
Lehmann (1937)	Kyphoscoliosis	M	14	119·1	149·3	8·50	3·6 ×S.D.
Lewis (1936)	Gigantism and acromegaly	M	46	194·3	172·7	6·50	3·3 ×S.D.
Komai and Fukuoka (1934)	Claimed to be diabetes insipidus	M	15	140·0	154·8	8·20	1·8 ×S.D.
Present case	Renal dwarfism	M	13	127·0	143·0	7·90	2·0 ×S.D.

Weill-Hallé et al. (1939) described a brother and sister both of whom were renal dwarfs. Graham and Hutchison (1941) recorded a family in which certainly 3, and possibly 4, of 8 siblings were renal dwarfs. Of these, 2 were twins, but they were clearly dizygotic, for they were of unlike sex. Danis and Rossen (1941) recorded renal dwarfism and rickets in a brother and sister. Mackay (1945) described a family in which 5 siblings had congenital lesions of the kidneys or of the ureters.

The importance of congenital lesions of the upper urinary tract causing pyelonephritis is emphasised by Erb and Summerfeldt (1941), who found, in 1148 consecutive necropsies on children, that 4·4% of such congenital anomalies were associated with pyuria during life. Hawthorne (1941) describes how such lesions lead to urinary infection which often persists despite therapy. Of 95 cases of urinary infection in childhood, 60% proved resistant to treatment owing to a congenital lesion demonstrable by intravenous pyelography. In a statistical review of 471 cases of congenital anomalies of the kidney and ureter Smith and Orkin (1945) stated that there is often predisposition to poor function and stasis, with retention and subsequent infection. Of this large series 10 seem to be anatomically similar in type to the present case. Although this type of pelvis is classed radiologically as a variant of the normal, it would appear to be an undesirable variant in view of possible complicating infection.

SUMMARY

A case of renal dwarfism is described together with an apparently normal uniovular twin brother in whom, however, intravenous pyelography demonstrated unusual renal pelves.

The published cases of unequal growth in uniovular twins, and the familial occurrence of renal dwarfism and rickets, are briefly reviewed.

I am grateful to Prof. Robert Platt for permission to publish this case, to Dr. E. D. Gray for the radiological investigation and report, to the Regional Transfusion Service, North-West Region, for determination of the blood-groups, and to the departments of clinical pathology and of medical photography, Manchester Royal Infirmary, for the pathological investigations and the illustrations respectively.

ADDENDUM

Since this paper was written, the following similar case has been studied.

A married woman, aged 22, was admitted to the Manchester Royal Infirmary under Dr. J. F. Wilkinson for low back pain, polyuria with nocturnal frequency of micturition and polydipsia, and anæmia. She had 3 brothers and 4 sisters, one of the sisters being her twin; all these were perfectly healthy. She had had nocturnal and diurnal polyuria and consequent frequency of micturition for as long as she could remember; she had always had to drink more than the

average both by day and by night. In June, 1949, she had become pregnant, and the doctor found that she was anæmic; and she had not responded to adequate iron therapy. Her pregnancy had terminated at the fourth month in a miscarriage associated with considerable blood-loss. Since the pregnancy the patient had become breathless on exertion and had frequent attacks of palpitations; over the same period she had had chronic aching pain over the sacrum, which was made worse by exercise. For the last two years she had noticed progressive blurring of vision.

On examination she was small but normally proportioned: height 55$^3/_4$ in., weight 84 lb. She was obviously anæmic, and her mucosæ and skin were rather dry. Her heart was enlarged towards the left side, the apex-beat being 1 in. outside the mid-clavicular line; her blood-pressure was normal, 115/75 mm. Hg. Movement of the lumbar spine was somewhat limited, with pain on extension and tenderness on percussion; the urine showed constant albuminuria; bilateral radiate cataracts typical of chronic hypocalcæmia were present in both eyes; there was, however, no evidence of latent tetany. The blood had a hæmoglobin content of 50% of the average normal (7·4 g. per 100 ml.), the colour-index being 0·83; total and differential white-cell counts were normal. The average protein content of the urine (Esbach) was 0·75 g. per litre; there was complete isosthenuria, sp. gr. being constantly 1·010; some red cells and pus cells were present on microscopy. The blood-urea level was 190 mg. per 100 ml., and the urea clearance 10% of the average normal. The serum-calcium level was 6·5 mg. per 100 ml., serum-inorganic phosphorus 7·9 mg. per 100 ml., serum-alkaline phosphatase 32 King-Armstrong units, and the alkali reserve 43 vol. CO_2 per 100 ml. Electrocardiography showed prolongation of the Q–T interval owing to the hypocalcæmia. Radiography showed that the epiphyses were normally closed, but there was evidence of renal osteodystrophy in that pseudo-fractures were present in the right 10th and 11th ribs. Radiography of the abdomen revealed no evidence of abnormal calcification or renal calculi. In summary, this was a case of normotensive uræmia with chronic hypocalcæmia and consequent formation of cataracts, but not showing any evidence of tetany because of the severe acidosis due to the renal failure. The patient had a refractory anæmia and an early osteodystrophy, both of which were secondary to the uræmia.

Her twin sister was 2$^3/_4$ in. taller than the patient and appeared perfectly healthy; she was not anæmic, her urine was of normal specific gravity and contained no protein, and her blood-urea level was 20 mg. per 100 ml. She was, however, in the later stages of pregnancy, and therefore intravenous pyelography has had to be delayed until after her future delivery.

The twins were considered to be uniovular by the method described above; this was confirmed by the blood-groups, these being identical as follows: O, cDe/cDe, M, S-negative, P-positive, Lewis a-negative b-positive, Lutheran a-negative, and Duffy a-negative.

This is, therefore, a further example of growth disparity in uniovular twins secondary to chronic renal failure in one of the pair; the disparity amounted to 7 cm., which is only just above the standard deviation of height appropriate to age and sex—i.e., 5·95 cm. (equivalent to 1·18 × S.D.)—and therefore only just outside the maximum variation in normal uniovular twins as defined by Stocks (1930).

I am grateful to Dr. J. F. Wilkinson for permission to publish this case.

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THE INVESTIGATION OF SUGAR TOLERANCE

JOHN FRIEND
M.D. Lond., M.R.C.P.
SENIOR REGISTRAR, PROFESSORIAL MEDICAL UNIT, MIDDLESEX HOSPITAL, LONDON

TESTS of glucose tolerance are designed to reveal a failure to maintain the blood-sugar level within normal limits under the stress of a carbohydrate load. The test may show normal or reduced tolerance. The latter is often termed "diabetic" despite the common finding of such a reduction of tolerance in many conditions other than diabetes mellitus. This diabetic type of glucose-tolerance curve has been described as "high and spread," although it is recognised that the degree of hyperglycæmia attained is of no significance (Spence 1920, MacLean and de Wesselow 1920, Mosenthal 1947a). Reduced sugar tolerance is shown by protracted hyperglycæmia. It is considered that two hours after 50 g. of glucose has been taken by mouth the venous blood-sugar level should normally fall to below 120 mg. per 100 ml. and that blood-sugar levels above this indicate a reduction of glucose tolerance (Hale-White and Payne 1926, Langner and Dewees 1942, Duncan 1947, Mosenthal 1925 and 1947b). Moyer and Womack (1950) allow 125 mg. per 100 ml. as the upper limit of normal.

As alternatives to complete tolerance tests and to estimation of the 2-hour blood-sugar level,* certain blood-sugar levels for both fasting and non-fasting states have been suggested as reliable indications of reduced sugar tolerance. Most workers give about the same figure for the upper limit of the normal range of the blood-sugar level in the fasting state. Hale-White and Payne (1926), Mosenthal (1947a and b), and Moyer and Womack (1950) regard 120 mg. per 100 ml. as the highest acceptable figure, whereas Joslin (1946) and Lawrence (1950) regard any fasting blood-sugar level above 130 mg. per 100 ml. as indicating diabetes mellitus. In the non-fasting state diabetes may be diagnosed, according to Joslin (1946), if the venous blood-sugar level exceeds 170 mg. per 100 ml. or the capillary blood-sugar level is above 200 mg. per 100 ml. in the presence of glycosuria. Lawrence (1947, 1950) expresses a similar opinion; but Moyer and Womack (1950), investigating 103 normal persons, could not define any postprandial blood-sugar level having this significance.

With a few exceptions, these standards of reduced sugar tolerance seem to have been suggested as a result of extensive experience over many years. They are critically examined here with the 2-hour blood-sugar level as the index of glucose tolerance.

INVESTIGATION

In the years 1940–49 inclusive, 1582 patients were submitted to a glucose-tolerance test of the standard type. One dose of glucose 50 g. was given by mouth after an overnight fast; the venous blood-sugar level was estimated at half-hourly intervals for two hours by Benedict's (1928) method until late in 1948, and subsequently by the method of Folin and Wu (1920) and Folin (1928).

In these 1582 tests a fasting blood-sugar level of at least 120 mg. per ml. was found in 431 cases and a 2-hour blood-sugar level of at least 120 mg. per 100 ml. in 424 of these 431 (table I). Therefore, if a fasting blood-sugar level above 120 mg. per 100 ml. had been taken to denote that a diabetic type of tolerance curve would follow, 7 (1·6%) persons would have been diagnosed incorrectly as intolerant of glucose. On the other hand, a considerable

* 1-, 1$^1/_2$-, and 2-hour blood-sugar levels mean the venous blood-sugar levels at these times after the administration of glucose 50 g. by mouth.

number of cases of intolerance would have been missed; for, though 1151 cases showed a fasting blood-sugar level under 120 mg. per 100 ml., only 982 had a 2-hour level under 120 mg. per 100 ml. Therefore 169 (26·8%) of the curves of diabetic type would have escaped detection.

When the fasting blood-sugar level was 130 mg. per 100 ml. or higher, the 2-hour blood-sugar level was invariably at least 120 mg. per 100 ml. Of the 593 curves of diabetic type only 378 showed a fasting level of 130 mg. per 100 ml. or higher; hence the remaining 215 (36·3%) would have been wrongly forecast as showing normal tolerance.

The height of the curve produced after the oral administration of glucose had, in this series, no significance. Table II shows clearly that blood-sugar levels of 170 mg. per 100 ml. or higher at 1 hour do not invariably denote a loss of tolerance to glucose. 607 curves showed a 1-hour level greater than 169 mg. per 100 ml. 75 (12·35%) of these did not show any reduction of glucose tolerance,

TABLE I—TWO-HOUR BLOOD-SUGAR LEVELS COMPARED WITH FASTING LEVELS

Fasting blood-sugar level (mg. per 100 ml.)	No. of cases	2-hour blood-sugar level (mg. per 100 ml.)			
		0–119	120–129	130–139	>140
0–119	1151	982	44	27	98
120–129	53	7	1	3	42
130–139	28	0	1	0	27
>140	350	0	0	0	350
Total	1582	989	46	30	517

since their 2-hour blood-sugar level was less than 120 mg. per 100 ml. 3 patients with a 1-hour hyperglycæmia in excess of 230 mg. per 100 ml. showed normal glucose tolerance, since the blood-sugar level fell to below 120 mg. per 100 ml. in the course of the second hour of the test (Beckwith 1947). There were 52 patients (8·8%) with reduced tolerance whose blood-sugar level did not reach 170 mg. per 100 ml. at 1 hour; these would have been incorrectly classified as normal from the 1-hour blood-sugar level alone. Similar, though smaller, errors were found when the $1^1/_2$-hour blood-sugar levels were examined (table III). 512 curves showed a $1^1/_2$-hour level higher than 169 mg. per 100 ml.; of these, 16 (3·1%) had fallen below 120 mg. per 100 ml. in the following half-hour. Adoption of 170 mg. per 100 ml. as the critical level at $1^1/_2$ hours would also have excluded 47 curves showing reduced tolerance—an error of 3·2% in 1469 tests.

DISCUSSION

As a result of the examination of 2-hour blood-sugar levels in a standard glucose-tolerance test reduced

TABLE II—TWO-HOUR BLOOD-SUGAR LEVELS COMPARED WITH ONE-HOUR LEVELS

1-hour blood-sugar level (mg. per 100 ml.)	No. of cases	2-hour blood-sugar level (mg. per 100 ml.)	
		0–119	>120
0–169	954	902	52
170–179	36	23	13
180–189	33	19	14
190–199	47	16	31
200–209	41	7	34
210–219	29	3	26
220–229	31	4	27
>230	390	3	387
Total	1561	977	584

TABLE III—TWO-HOUR BLOOD-SUGAR LEVELS COMPARED WITH $1^1/_2$-HOUR LEVELS

$1^1/_2$-hour blood-sugar level (mg. per 100 ml.)	No. of cases	2-hour blood-sugar level (mg. per 100 ml.)	
		0–119	>120
0–169	957	910	47
170–179	25	9	16
180–189	34	2	32
190–199	20	1	19
200–209	26	2	24
210–219	23	0	23
220–229	30	1	29
>230	354	1	353
Total	1469	926	543

tolerance may be revealed. No further information may be gleaned from the test. In diabetes mellitus there is no relation between the blood-sugar levels during a tolerance test and the severity of the diabetes (as judged by daily requirements of insulin). The so-called renal sugar threshold can be assessed only with great inaccuracy from the results of an investigation which commonly uses venous blood and makes no allowance for variation of glomerular filtration-rate in the kidney (Mirsky and Nelson 1943). Complete standard tolerance tests cannot be justified, since the only information obtained from the five blood and three urine examinations of the test can be found equally well by estimation of a single 2-hour blood-sugar level.

This analysis shows that, if the 2-hour blood-sugar level is the index of glucose tolerance, errors occur if fasting or postcibal blood-sugar levels are taken in place of the 2-hour level. Normal people are included in the group showing reduced tolerance, no matter which criterion is adopted, apart from a fasting level exceeding 130 mg. per 100 ml., though Gray (1923) found that 2·3% of 431 normal people showed a fasting blood-sugar level higher than this. He did not, however, indicate whether or not the 2-hour level in these cases signified reduced tolerance, and distinguished only that these people had not got clinical diabetes mellitus.

TABLE IV—ERRORS ARISING WITH DIFFERENT CRITERIA

Blood-sugar level used as criterion (mg. per 100 ml.)	No. of cases	No. of normal curves wrongly included	No. of curves of diabetic type wrongly excluded
Fasting >120	431	7 (*1·6%*)	169 (*26·8%*)
Fasting >130	378	Nil	215 (*36·3%*)
1 hour >170	607	75 (*12·3%*)	52 (*8·8%*)
1 hour >200	491	17 (*3·46%*)	110 (*18·5%*)
$1^1/_2$ hour >170	512	16 (*3·1%*)	47 (*8%*)
$1^1/_2$ hour >200	433	4 (*0·9%*)	114 (*19·2%*)

Relying on the fasting and postcibal blood-sugar levels as evidence of reduced tolerance instead of the 2-hour blood-sugar levels would have caused an omission of cases which did show, in fact, reduced tolerance in their 2-hour levels (table IV). If the fasting blood-sugar levels alone had been taken as an index of reduced sugar tolerance, curves of diabetic type, sufficient in number to invalidate the fasting blood-sugar level as a diagnostic aid, would have escaped detection. Though a fasting level above 130 mg. per 100 ml. confirms a reduction of sugar tolerance, a normal fasting blood-sugar level is of no significance. Similarly, table IV shows that adoption of the 1-hour or the $1^1/_2$-hour blood-sugar level as a criterion of reduced tolerance will lead to the exclusion of a considerable number of curves of diabetic type.

It is concluded that there are no sensitive specific methods of detecting reduced tolerance other than estimation of the 2-hour blood-sugar level.

SUMMARY

1582 standard glucose-tolerance tests have been analysed.

If reduced tolerance of sugar is indicated by a venous blood-sugar level higher than 120 mg. per 100 ml. 2 hours after taking glucose 50 g. by mouth, 593 results in this series showed reduced tolerance.

The blood-sugar levels, both fasting and postcibal, suggested as being significant of reduced sugar tolerance, are unreliable.

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DUODENAL INTUBATION WITH MAGNET-TIPPED TUBES

A. H. JAMES
M.A., D.M. Oxfd, M.R.C.P.
ASSISTANT TO THE MEDICAL UNIT, ST. MARY'S HOSPITAL, LONDON

INTUBATION of the duodenum, undertaken for diagnosis, treatment, or research, is often difficult. Sometimes a tube passed into the stomach and pushed further enters the duodenum at once; more often it becomes coiled in the stomach, the tip being found usually at the pylorus or in the gastric fundus; partial withdrawal and replacement may or may not overcome the hindrance.

Various procedures are used to assist passage through the pylorus, the most usual being to lay the patient on his right side and introduce the tube extremely slowly. Delay results mainly from ignorance about what is happening to the tube-tip, so that manœuvres are often misdirected; for example, a tube coiled in the fundus rarely finds its way into the duodenum however long the patient lies on his side. At present this can only be overcome by using radiology, the progress of the tube being watched on the fluoroscopic screen or by means of serial films. In practice such methods have many disadvantages; if the procedure is lengthy, as it often is, it hinders the work of busy radiological departments; if the screen is used the work has to be done in the dark, and the possibility of overdosage with X rays makes it necessary to hurry. These difficulties are magnified when the patient is a small child; and very ill patients cannot be taken to the X-ray apparatus.

In the course of research requiring duodenal intubation we have developed a method of locating the tube-tip without the help of X rays, and have found this of practical value with both adults and children. A small permanent magnet is incorporated into the tip of the tube, and its position within the abdomen found by detecting its magnetic field with a small compass needle. Magnets of a size which can be used are detectable at a range of about $3^1/_2$ in., and a compass pressed on the abdomen can be brought within this distance of most parts of the stomach and duodenum.

CONSTRUCTION

To make sufficiently powerful magnets one of the highly magnetisable nickel-cobalt-aluminium alloys must be used: in this work magnets were made of 'Ticonal' (Mullard Electronic Products Ltd.). This alloy cannot be machined and has to be ground to suitable size and shape on a grindstone. For use in adults the magnet should be cylindrical, 2·5 cm. long and 6 mm. in diameter, and tapered slightly at each end. For children the diameter should be 4 mm. and the length 2 cm., or less for small infants. The magnet is inserted into suitable rubber tubing (no. 3 I.R.) and the end closed by dipping into crude 'Latex,' which, when dried, makes a satisfactory rounded end. Holes are cut as required. A plotting compass, measuring $^3/_4$ in. in diameter and $^1/_4$ in. in depth, is used.

METHOD

When the tube-tip is lying horizontally and the compass is placed over it, the needle oscillates more rapidly than it does in the earth's field, and aligns itself in the axis of the tube; one end or other will always point in the direction of the tube-tip, and which end does this must be discovered by trial before the tube is passed. In this way the orientation, as well as the position, of the tube-tip in the stomach can be determined. If the magnet is "end-on" below the compass, the needle will be seen to dip; and according to which end dips it can be decided whether the tube-tip is pointing towards or away from the compass. A little practice with a compass and magnet will make these points clear. Sometimes the polarity of the compass needle becomes reversed during the intubation, under the influence of the strong field of the tube magnet; this causes the needle to point in the opposite direction relative to the tube. It is usually obvious when this has happened, and it can be confirmed by a reference magnet, or by observing the orientation in the earth's field.

For duodenal intubation, the tube is passed into the stomach and then sought by pressing the compass on to the abdomen with the patient lying flat. The compass must be held horizontally so that the needle can swing freely. When it comes near the tube-tip the needle, previously swinging slowly in the earth's field, is seen to swing much more rapidly, and to point in a new direction; the place at which it swings most rapidly is the best guide to the position of the tube.

Ideally the tip is found first in the mid-epigastrium, pointing transversely to the right, and very superficially as judged by the rapidity of the oscillations. When the tube is pushed further the tip is next found slightly above and to the right of the previous position, and pointing away from the compass—that is, backwards through the pyloric canal. Finally when it enters the duodenum the tip is found at the outer border of the right rectus, pointing downwards, and much less superficially. When this sequence has been observed the tube is almost certainly in the duodenum. Often only the first and last positions are seen. When the tip is obstructed in the fundus of the stomach it is less easy to localise exactly, but a magnetic field can be detected below the left costal margin or outside the left lower chest. In children the findings are similar, the shorter distances in the child compensating for the smaller size, and therefore slighter power, of the magnet.

RESULTS IN ADULTS

Duodenal intubation has been attempted with a magnet-tipped tube in 17 adults. When the tube was thought to have entered the duodenum, as judged by the compass, a radiograph was taken. In 14 instances

the tube was in fact in the duodenum, and in the remaining 3 it was in the pyloric antrum. The compass thus proved correct in 82·5% of cases; and mistakes, naturally more liable to be made with fat patients, became less common with practice. None of these patients had distended abdomens from intestinal obstruction; in such cases deep palpation with a compass is more difficult, but at the crucial point—namely, the pylorus—the tube-tip overlies the spine and is therefore more easily approached. With such patients a larger magnet would have a decided advantage.

A magnetic-tip is also of value in tubes used for gastric aspiration, particularly where, as in research, it is necessary to be certain that the fluid so obtained is really of gastric origin.

INTUBATION IN INFANTS AND CHILDREN

Duodenal intubation of children is necessary for the certain diagnosis of fibrocystic disease of the pancreas, but often has to be abandoned after attempts which may last several hours have ended in failure. The magnet-tipped tube, enabling the work to be done in the ward, in daylight and at leisure, while providing constant information about the progress of the tube, has greatly increased the chances of success and reduced the time in which it can be achieved.

The attempt was made in 21 children whose ages ranged from one month to six years, 8 being one year old or less. In 20 the duodenum was reached (X-ray confirmation being obtained in each instance), although in 1 case the tube was regurgitated before a satisfactory sample could be obtained; the remaining child, a boy aged 3, resisted so strongly that the attempt had to be abandoned. Most samples were got in 15–45 minutes; one took 2 hours. The juice was allowed to drip out without the aid of suction.

Three procedures were found of the greatest assistance:

1. The tube is more easily swallowed and controlled if it can be passed through the nose. In 8 cases where it was not possible to do this owing to buckling of the tube, success was achieved with the aid of a piece of copper wire passed in through one of the holes to rest on the back of the magnet. By this means it was possible to push the tube through the nose, and the wire was then withdrawn.

2. When the tube becomes stuck repeatedly in the fundus of the stomach, it should be withdrawn into the œsophagus and replaced with the child lying face downwards.

3. When the tube is in the pyloric antrum and pointing to the right, gentle pushing at the nose, combined with intermittent pressure on the epigastrium, has often caused it to enter the duodenum without delay.

In palpating a child with a compass it is particularly important to keep the compass level; when the child is crying, reliance can be placed on the behaviour of the compass only during the momentary relaxation accompanying inspiration.

CONTROL OF INTESTINAL TUBES WITH A MAGNET

Various workers have tried to pull a tube through the pylorus with a magnet. Mayer (1944) inserted a small magnet made of 'Alnico,' an alloy similar to ticonal, into the tip of a Miller-Abbott tube; using an electromagnet placed on the right chest wall, he claimed that he was always able to pull the tube into the duodenum under fluoroscopic guidance. At the start of this investigation it was hoped that the magnet-tipped tubes would have the double advantage that they could be moved with a magnet outside the body as well as detected with a compass. A ticonal magnet was made, of the largest size that could be conveniently handled—such a magnet being more powerful than an electromagnet worked by any supply of direct current likely to be available. While this magnet could exert a pull on the tube of 100 g. at a range of 0·5 cm., at 10 cm. the pull was only 6–8 g., and the distance from the pylorus to the lateral chest wall is usually greater than this. In practice there was never a convincing instance of a tube having entered the duodenum more rapidly with the magnet's help than without. It was often possible to bring the tube out of the fundus and into the pyloric antrum, especially in children; but this can be done by more simple methods, such as that described above. For these reasons magnet-tipped tubes are of value only for use in conjunction with a compass.

My thanks are due to the staffs of this hospital, of Princess Louise Hospital, Kensington, and of the Queen Elizabeth Hospital, Hackney Road, for permission to make observations on patients under their care, and especially to Dr. W. F. Young for assistance with many of the intubations; and to Dr. E. Rohan Williams and the staffs of the radiological departments of the above hospitals for their kind help.

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PROCAINE WITH HYALURONIDASE AS LOCAL ANÆSTHETIC

J. N. THORPE
M.B., Edin.
ANÆSTHETIC REGISTRAR, UPTON HOSPITAL, SLOUGH, BUCKS

FOR the reduction of Colles's fracture and similar injuries, the anæsthetic which is probably most often employed is nitrous oxide. This, however, has several drawbacks. Its anæsthetic properties are so slight that it is always given with a very small concentration of oxygen, which may be dangerous, particularly where the patient—like so many with Colles's fracture—is elderly and has cardiovascular disease. In the young fit adult it is even harder to obtain satisfactory anæsthesia with nitrous oxide, and impossible to obtain adequate muscular relaxation. Postoperative vomiting with its attendant risk of aspiration—slight though this may be—is not uncommon with nitrous oxide if the period of anæsthesia is prolonged; and when radiography does not show proper reduction of the fracture, the patient has to have another anæsthetic for correction of the deformity.

If general anæsthesia is required, a quick-acting barbiturate is preferable (1) for the patient because it is more pleasant than nitrous oxide and does not involve anoxia, (2) for the anæsthetist because quiet anæsthesia is rapidly and simply achieved, and (3) for the surgeon because the patient is immobile with muscles relaxed. Its chief disadvantage is that the patient requires a bed and nursing supervision for some time after administration, either or both of which are difficult to provide in a busy and short-staffed outpatient department.

Brachial-plexus block has been used for the reduction of Colles's fracture; but it is time-consuming, not without danger, and, in inexpert hands at any rate, often fails.

The anæsthetic of choice in the treatment of this condition appears to be local infiltration anæsthesia. But this method, though described in most of the orthopædic textbooks, is not widely practised, because satisfactory analgesia is not attained until the injected anæsthetic agent has diffused into the tissues surrounding the fracture site, which may take a quarter of an hour or more. Even then, if diffusion has been insufficient—and this is not uncommon—some pain is experienced during the subsequent manipulation. For these reasons most surgeons tend to regard local infiltration analgesia as a last resort where general anæsthesia cannot be used.

A modification of this technique[1] has recently been tried at the Upton Hospital with promising results. Before injection the local anæsthetic agent (for Colles's fracture 20 ml. of 1% procaine) is mixed with 1000 "Benger units" of hyaluronidase ('Hyalase'), which promotes

1. Kirby, C. K., Eckenhoff, J. E., Looby, J. P. *Surgery*, 1949, **25**, 101. Moore, D. C. *Anesthesiology*, 1950, **11**, 464.

diffusion of injected substances. Two injections are made: the bulk of the solution is put directly into the fracture hæmatoma from the extensor aspect of the forearm, and 2–3 ml. is infiltrated around the ulnar styloid process. The anæsthetic solution diffuses rapidly all round the injured area and the fracture can be manipulated as soon as the needle is withdrawn. The patient, being ambulant, can at once walk unaided to the X-ray department, and, if reduction is found to be incomplete, further manipulation is possible straight away.

To date, this technique has been used in 22 cases of Colles's fracture and 4 cases of Pott's fracture (using 40 ml. of 1% procaine for the latter). Though the series is very small, we have been struck by the rapidity with which analgesia is achieved and by the fact that it has always been complete. Despite the rapid absorption of the anæsthetic, the fracture area remains pain-free for well over an hour: in one of the cases of Pott's fracture, three manipulations were required over a period of 1¼ hours and no pain was experienced during that time.

I should like to express my thanks to Mr. G. P. Arden, accident and orthopædic surgeon, for his interest and advice, and to Mr. I. J. Gordon, the resident surgical officer, who performed most of the manipulations.

A CASE OF
CONGENITAL AFIBRINOGENÆMIA

A. I. D. PRENTICE
M.C., M.B. Camb.
ASSISTANT PATHOLOGIST,
ESSEX COUNTY HOSPITAL, COLCHESTER

ONE of the causes of a hæmorrhagic diathesis is congenital absence of fibrinogen. Though the defect can be demonstrated without difficulty, the condition may be overlooked because of its rarity; for only eight or nine cases have been recorded, the first in 1920 by Rabe and Salomon. In the following case, which showed all the features of this interesting state, a necropsy was performed.

CLINICAL RECORD

The patient, an architect's assistant aged 19, was admitted to the Essex County Hospital on Nov. 19, 1947, complaining of pain in his chest.

History.—From the time of his birth, when his cord bled profusely, he had lost large amounts of blood from minor injuries and had always bruised easily. The main bleeding episodes, previously attributed to hæmophilia, were:

Age (years)	Injury sustained	Treatment given
3	Minor crush injury to finger	Three weeks in hospital. Treatment unknown
7	Cut finger	Snake venom applied without effect; ½ pint of his mother's blood stopped the bleeding
8	,, ,,	Fortnight in hospital. Transfusion
10	,, ,,	Bleeding controlled after the second bottle of blood. Had a minor operation on his finger immediately after, but had no trouble from this
11	,, ,,	In hospital. Bleeding controlled by transfusion
13	Perforating injury to foot	Fresh blood, applied locally, stopped the hæmorrhage

His only other illness was whooping-cough in infancy.

There was no family history of bleeding. His parents came from different parts of the country and there was no known consanguinity in the last three generations. A sister and brother are both alive and well.

In October, 1947, he developed headaches and pain down the back of his neck, sweated profusely, and felt very weak. He had a spontaneous epistaxis for which he was admitted to hospital and given 1500 ml. of blood. This controlled the hæmorrhage and he was again discharged. A week later he began to get pain shooting across the right side of his chest, and he was admitted to the Essex County Hospital for the first time.

Examination.—He was lean, but otherwise normally developed. He had a pyrexia of 100–102°F and persistent tachycardia 110–140 per min.; respirations were 30–35 per min. Physical signs indicated a large collection of fluid in the right pleural cavity and this was confirmed radiologically. His joints showed none of the changes to be expected in a hæmophilic.

Blood Examination.—Hæmoglobin 70%; red cells 3,600,000 per c.mm.; white cells 25,000 per c.mm. (polymorphs 96%, lymphocytes 3%, monocytes 1%); platelets 280,000 per c.mm. Bleeding-time: 6 min. 30 sec. (Duke's method). Clotting-time: no clot after 2 hours (capillary tube method).

Course of Illness.—Aspiration of the chest yielded 28 oz. of turbid dark-brown fluid containing many polymorphs and red blood-cells and scanty epithelial cells. No organisms were revealed by Gram or Ziehl-Neelsen staining. Aerobic and anaerobic cultures were sterile.

As he had been treated with sulphonamides before admission, a provisional diagnosis of pneumonia, sterile empyema, and hæmorrhagic diathesis of unknown ætiology was made. During the next few weeks, however, the pleural effusion re-formed repeatedly after aspiration. The five aspirations all caused considerable oozing from the puncture wound, and the later ones showed increasing proportions of lymphocytes to polymorphs. No organisms were seen in direct films; all cultures were sterile; and all cultures for tubercle bacilli were negative. Two inoculated guineapigs were free from tuberculosis after six weeks. Four specimens of sputum were examined and two were cultured for tubercle bacilli with negative results.

On Dec. 4 it was decided to remove as much fluid as possible and replace it by air. After withdrawal of 7 pints, radiography next day showed a completely collapsed right lung and a residue of fluid at the right base. During the next two weeks signs of consolidation developed at the base of the left lung and the patient began to cough up heavily bloodstained sputum. A transfusion of 2 pints of blood on March 11, 1948, brought temporary improvement, and on April 2 a further transfusion with 80 ml. fibrinogen solution and 3 pints of blood was given. But his clinical condition deteriorated, and on April 6 he became cyanosed and dyspnœic, and died.

SPECIAL INVESTIGATIONS

On March 16, 1948, the erythrocyte-sedimentation rate had been estimated and it was noted that the fall in 1 hour was 5 mm., an exceptionally low value considering the patient's state. This, coupled with the fact that his X-ray films showed a deficient fibrin formation, suggested that the case might be one of congenital afibrinogenæmia. A further series of experiments was therefore undertaken:

1. A specimen of the patient's fresh whole blood was incubated at 37°C for three days. No clot formed.

2. His plasma was heated to 60°C. No fibrin was precipitated.

3. Quarter saturation of the plasma with ammonium sulphate failed to bring down a precipitate of fibrin.

From these three tests it was concluded that the patient was completely lacking in fibrinogen.

4. Prothrombin-time was estimated by Quick's method. The control clotted in 12 sec. With the patient's plasma, a faint granular precipitate appeared after a few seconds, but no clot or flakes of fibrin. Quick's test was again carried out, using as a control 50% normal plasma diluted with saline and the patient's plasma to which was added an equal volume of 1·2% solution of fibrinogen. The control clotted in 21 sec. and the patient's plasma in 6 min.

From this it was deduced that the patient's blood contained some prothrombin.

5. *The Bleeding-time.*—In the eight cases reviewed by Henderson et al. (1945) the bleeding-times varied between 5 and 30 min., and in the case described by Pinniger and Prunty (1946) it was 3½ min. In the present case the shortest bleeding-time recorded was 1 min. (Ivy's method), using the smallest prick necessary to draw blood, and the longest time was 20 min. Pricks of the finger pulp always stopped

bleeding within 2–3 min., whereas bleeding caused by the aspiration needle in the chest wall went on for several days. Bleeding sometimes stopped temporarily and recurred in about 20 min., presumably as the temporary contraction of the capillaries (Macfarlane 1945, 1948) wore off.

The bleeding-time, therefore, even when uncomplicated by clotting, gave results which varied widely according to such factors as the rate and degree of capillary contraction, the support offered by surrounding tissues, the depth of the prick and possibly the speed and completeness with which platelet agglutinates plugged the vessels.

6. *Capillary Fragility.*—As in most of the previously reported cases, the capillary fragility (as tested by Hess's method) was not increased, and capillary microscopy showed normal response of the capillary to injury.

7. *Erythrocyte-sedimentation Rate.*—An attempt was made to compare the sedimentation of the patient's blood and "defibrinated" blood (made by adding cells to a serum, which before defibrination sedimented at 50 mm. per hour). Measured at fifteen-minute intervals over 3 hours the two sedimentation curves showed a similarity, a fact which might be held as doubtful evidence that other globulins were present in the patient's plasma in approximately the proportions that would be expected from his condition. Rouleaux formation, though present in wet-blood preparation, was not conspicuous.

8. *Agglutination.*—Apitz (1937, 1939) postulated a precursor of fibrin which he called "profibrin" and suggested that platelet agglutination depended on the coating of the platelets with this substance. It has also been suggested that certain forms of erythrocyte agglutination depend on this factor (Quick 1942). Accordingly, blood-grouping and rhesus-grouping were carried out under the microscope; but no abnormality was noted in the agglutinated clumps. The platelet agglutinates in wet-blood-film preparations were also examined but appeared to be normal. The fragility of the red cells was normal. In this case, therefore, unless the fibrinogen was present in very minute amounts, its product "profibrin" did not appear to exert any obvious influence on agglutination.

9. The platelets were counted twice, and on the first occasion were 280,000 per c.mm. and the second 420,000 per c.mm. Of the other eight reported cases, only two showed a temporary thrombocytopenia.

10. *Investigation of Relatives.*—Two of the cases described previously had relatives showing a hæmorrhagic tendency. We therefore carried out fibrinogen estimations and clotting-times on all our patient's available living relatives. All reports fell within the limits of normal except that a maternal aunt on two occasions had a plasma fibrinogen of 0·12%. She had had no "bleeding incidents" and her blood clotted and retracted normally.

POST-MORTEM FINDINGS

Necropsy (April 6)

Wasting. An ecchymosis in the right forearm surrounding the site of a venepuncture. Right chest considerably flatter than left.

Cardiovascular System.—No clotting was found in any of the vessels or the heart. The pericardial cavity contained 3–4 oz. clear, serous fluid. The heart appeared normal, though the muscle was pale.

Respiratory System.—The trachea and bronchi were filled with bloodstained mucus. On the left side there was 8 oz. of clear brown fluid. The visceral and parietal pleuræ were studded with nodular thickenings, particularly over the upper lobe and along the line of division between the upper and lower lobes. Both lobes of the left lung showed confluent tuberculous bronchopneumonia, apart from a small area at the apex. There was considerable infiltration of fibrous tissue in the lower lobe.

On the right side the pleural cavity was completely obliterated by adhesions; the adherent layers, which were $^1/_4$ in. thick, surrounded a shrunken fibrotic lung. The upper lobe was normal.

Abdomen.—The liver was enlarged (8 lb.); its surface was smooth and it showed a normal pattern. The cut surface was firm and the cut edge bulged out below the capsule. The lobular pattern was distinct, but the whole organ was paler than normal. The spleen (10 oz.) was approximately double the normal size, and the cut surface was red and diffluent. The kidneys, ureters, and bladder were normal. The stomach was filled with altered blood but no other abnormality was found in the alimentary tract.

All other organs were macroscopically normal.

Morbid Histology

The *liver* showed slight fatty degeneration at the periphery of the lobules and moderate albuminous degeneration. Scattered throughout there were very scanty giant-celled tubercles. There was no microscopical cause for the great increase in weight.

In the *spleen* the malpighian bodies were enlarged with plasmacytoid mononuclear cells, polymorphs, and round cells with a rim of pale eosinophil cytoplasm and nuclei resembling those in the outer part of the malpighian body. Four giant-celled tubercles were found in one of these sections.

The *sternum* showed a normal bone structure. The marrow was very cellular and a single giant-celled tubercle was seen. There were, however, groups of hyaline, palely eosinophil masses resembling necrosed bone surrounded by granular debris.

All sections of the *lungs* showed confluent giant-celled and caseous tubercles and acute necrotising tuberculous pneumonia. The collagen fibres of the visceral pleura were separated by œdema fluid and there were scanty included tubercles. Groups of alveoli in the lungs contained eosinophil hyaline coagula (œdema fluid), but none of them showed gram-positive fibrin, and no fibrin strands were seen on the pleura. Sections of the lung, stained by the Ziehl-Neelsen method, showed acid-fast bacilli in large numbers.

The sections of skin, kidneys, myocardium, and pancreas were normal.

DISCUSSION

The rarity of this condition is the only stumbling-block in diagnosis, which, when reached, is irrefutable. From the eight cases reviewed by Henderson et al. (1945) the main features were shown to be:

1. A hæmorrhagic tendency from birth.
2. Easy bruising.
3. Sometimes consanguinity between the parents.
4. A poor prognosis (4 patients died in childhood).
5. A very slow, constant sedimentation-rate.
6. In all cases an absolute afibrinogenæmia and absence of clotting.

The present case conforms well with these criteria.

With regard to the fibrinogen and blood-transfusions given three days before the patient's death, if it is assumed that there was a circulating fluid of $5^1/_2$ litres, at the end of the fibrinogen transfusion (containing 0·96 g. of fibrinogen) his plasma fibrinogen should have been in the region of 0·017 g. per 100 ml. A specimen of blood was taken at this stage and incubated for twenty-four hours, at the end of which time no clot had formed. In fact, with only this small amount of circulating fibrinogen, a soft gelatinous clot will form in whole blood.

Immediately after the fibrinogen transfusion 1000 ml. of whole blood was given, the equivalent of 3 g. of fibrinogen. This in itself should have raised the patient's plasma fibrinogen to 0·055 g. per 100 ml.—an amount capable of producing quite a solid clot. A blood sample taken after this transfusion, however, again failed to clot. An explanation might be that because of his multiple tuberculous lesions the fibrinogen was utilised from the circulation as soon as it was put in. On the other hand, examination of sections did not reveal fibrin. Possibly the amount was too small to detect by this method.

Pinniger and Prunty (1946) transfused their patient with 300 ml. of a concentrated solution of plasma and took specimens of blood at intervals. They were able to show the presence of clotting three days after transfusion, and flakes of fibrin were detected after eight days.

The modification of the tuberculous lesions by the lack of fibrinogen is difficult to assess. Immunity must depend partly on the localisation of bacteria by fibrin, and indeed this patient had extensive disseminated tuberculosis. The fluids aspirated from the chest did not contain clots and it is interesting to surmise how the collagenous pleural adhesions still formed despite the apparent lack of a fibrin scaffold.

The significance of the relative lack of abnormality of the enlarged liver is not very clear. It seems that if fibrinogen is indeed manufactured in the liver its absence does not produce any obvious pathological change in the cells; and whether the enlargement is the result or the cause of the afibrinogenæmia is not plain. Certainly the small number of tubercles in it could not be responsible for such a degree of hepatomegaly.

SUMMARY

A case of congenital afibrinogenæmia complicated by tuberculosis is described. The clinical and pathological features are compared with those of previously reported cases.

I would like to thank Dr. S. A. Propert for permission to publish this case, and Dr. D. J. O'Brien for making the histological examinations.

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POLIOMYELITIS AND POLIOENCEPHALITIS WITH OPSOCLONIA FOLLOWING APPENDICECTOMY

M. D. WARREN
M.B. Lond.
LATE RESIDENT MEDICAL OFFICER, HERTFORD COUNTY HOSPITAL; SQUADRON-LEADER, R.A.F.

THERE is an increasing number of reported cases of poliomyelitis in which a relation appears to exist between previous trauma and the site of maximum paralysis.

As long ago as 1910 Sheppard, in Massachusetts, noticed a relation between tonsillectomy and the onset of poliomyelitis. Reviewing many of the subsequent reports Aycock (1942) concluded that the proportion of cases of bulbar poliomyelitis following tonsillectomy was significant. This observation has been confirmed by Rhodes (1947) and other workers.

McCloskey (1950) and Geffen (1950) have observed an association between prophylactic immunisation and poliomyelitis, the inoculated limb being affected more severely. These observations were noticed particularly after pertussis or combined pertussis-diphtheria inoculations. A similar phenomenon has been reported after injections of T.A.B. vaccine and penicillin (Russell 1949). Possibly some similar cases of poliomyelitis were included among the shoulder-girdle syndrome described as localised neuritis by Spillane (1943) and as neuralgic amyotrophy by Parsonage and Turner (1948).

Many precipitating causes have been suggested, including tooth-extraction. This is a common operation and therefore information about the relationship is more readily accessible. Aycock (1942) summarised the then available evidence as follows: "It would appear that this reported circumstance can be relegated to the category of miscellaneous precedent events of no ætiologic significance." This view still holds.

The association with appendicectomy has only rarely been reported.

CASE-RECORD

A boy, aged 7 years, was referred to the surgical outpatients department of Hertford County Hospital on Aug. 20, 1946, and was seen by Mr. W. Donald Bedford. He had had intermittent attacks of epigastric pain during the last year. His doctor had seen him during the attacks and considered that these were due to appendicular colic. The child had had pneumonia three years previously but otherwise, except for the attacks already mentioned, he had been quite well. He had had no headaches, and his bowels had been generally regular. On examination the ileocæcal glands were palpable, and in view of the history the child was admitted for appendicectomy.

Operation.—Mr. Bedford removed the appendix on Sept. 5, 1946. The child was premedicated with 'Nembutal' gr. 2 and atropine gr. $^1/_{100}$. He was anæsthetised by Dr. H. S. H. Gilmer with thiopentone, gas, oxygen, and 'Trilene.' Through a Battle's incision a long kinked retrocæcal appendix was removed. The wound was stitched up without drainage tubes. For three days after the operation the child had a mild pyrexia in the evening (99·0°–99·8°F). However, the wound healed satisfactorily, the temperature settled, and he was discharged to convalescence at home on the seventh post-operative day.

Readmission.—On Sept. 17, twelve days after his operation, he was readmitted. On Sept. 15 his parents had noticed that he was hot and delirious ("saw envelopes on the wall"). Later on Sept. 15, he had become rational; that night he had vomited. Next morning he had again been delirious, and his temperature had been 104°F. He had spent a restless night, and on Sept. 17 he had once more become rational. On admission he complained of a severe basal headache and of pain in the lower abdomen. He had no limb pains or backache. Temperature 101°F; pulse-rate 128. His abdomen was grossly distended and tympanitic, and his bladder was distended up to the umbilicus. He was also tender over the right kidney and could not sit up. There was a mild degree of neck rigidity. Further questioning of the parents revealed that the child had passed very little urine since Sept. 16 and had been constipated since the 15th. Mr. Bedford suggested the diagnosis of acute poliomyelitis.

Course of Illness.—On Sept. 18 the paralysis had spread to the neck muscles. No urine had been passed since a small amount after admission, and 19 oz. was withdrawn by catheter. Next day the temperature had settled to normal, but there was complete flaccid paralysis of the legs except for some plantar flexion. No tendon-jerks could be elicited. Lumbar puncture on Sept. 18 produced clear cerebrospinal fluid containing total protein 90 mg. per 100 ml. and 49 white cells per c.mm. (report by Dr. V. Magee). The urine, sp. gr. 1·012, contained nothing abnormal except acetone. Blood-culture was sterile, and a blood-count showed Hb 15 g. per 100 ml., red cells 5,580,000 per c.mm., colour-index 0·99, white cells 18,600 per c.mm. (filamented polymorphs 74%, non-filamented polymorphs 4%, lymphocytes 20%, and monocytes 2%).

On Sept. 19 cyanosis and respiratory embarrassment were noted. The accessory muscles of respiration were being used, and by the evening it was necessary to put the child into an "iron lung." At the same time weakness of the shoulder-girdle muscles and wrist-drop developed. During the next three days catheterisation continued to be necessary and the bowels were not opened.

His condition remained much the same, except for restoration of function in the bladder and bowels, until Oct. 2. During this time he was apyrexial, except for an evening temperature of 99°F on Sept. 26, 27, and 28. His pulse-rate was 104–132. On Oct. 2 he was removed from the "iron lung" for an hour, and this period was gradually increased until on Oct. 15 he was removed completely from it. Since Sept. 20 splinting to prevent muscle-stretching, and passive movements and massage had been instituted as indicated by the palsies.

On Oct. 11 he had a pyrexia of 99°F and he continued to have a temperature fluctuating between 98·6° and 100°F until his death on Oct. 23. His general condition seemed to remain static until on Oct. 18 he developed twitchings of the right side of his face and his right arm and was incontinent of urine and fæces. This attack recurred on and off during the day. Towards evening the right arm was no longer involved but three new features had developed: he became cyanosed during the attack; he lost consciousness for periods of about an hour; and he had a peculiar oscillation of his eyes, which seemed to roll in a circular movement. The attacks continued on Oct. 19, and the child was delirious, disoriented, and hallucinated. Polioencephalitis was diagnosed.

On Oct. 20 he became unconscious and was given intramuscular penicillin 20,000 units three-hourly as a prophylactic against pneumonia. He died on Oct. 23 without having regained consciousness. Permission for a necropsy was not given.

DISCUSSION

The incubation period of poliomyelitis is considered to be 7–17 days and is usually about 14. This lad developed his first symptoms 10 days after his operation

and was therefore in or near the incubation period at the time of the operation. The first signs—i.e., paralytic ileus and a paralysed bladder—occurred in the area of trauma. Gaustad (1948) recording a case of poliomyelitis seven weeks after appendicectomy, noted that the muscles near the operation site were paralysed, particularly the right psoas. Mills (1947), however, reported that 3 of 33 cases of acute poliomyelitis in which no operation was performed developed paralytic ileus. The symptoms of bowel paralysis appeared three days after the first onset of paralyses in the voluntary muscles and in all 3 cases there were absolute constipation and retention of urine. Mills advised the use of neostigmine 0·5 ml. daily, but in the present case normal function returned after five days, and except for catheterisation no other treatment was thought necessary for the paralytic ileus. Critchley (1948) pointed out that in the 1947 epidemic "retention of urine was frequently encountered in the poliomyelitis patients both before the onset of paralysis and after."

The peculiar ocular movements in association with polioencephalitis were first described by Orzechowski (1927), who called them opsoclonia. Marmion and Sandilands (1947) described a case in a boy, aged about 3 years, who developed in both cases rapid jerking nystagmoid movements occurring in groups of up to six. The movements occurred in horizontal, vertical, and oblique directions and came on with attempts to fix the gaze. Their case also showed rapid head-nodding tremors. The boy did not develop paralyses and recovered completely. McAlpine et al. (1947) reported a similar case. Other eye signs reported are diplopia, nystagmus, ptosis, and complete paresis of the occulomotor nerve (*British Medical Journal* 1947).

Finally, the recurrence of symptoms, and the onset of polioencephalitis, four weeks after the initial symptoms of poliomyelitis, appears to be unusual, and the encephalitis in this case was also exceptionally widespread.

I wish to thank Mr. W. D. Bedford, consulting surgeon to Hertford County Hospital, for permission to publish the case-record, and Air Marshal P. C. Livingston, Director-General of the medical branch of the Royal Air Force, for permission to publish.

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New Inventions

A TIDAL SPIROMETER

ONE of the difficulties in using muscle relaxants in anæsthesia is to know when and how much to give. An objective method of determining the patient's requirements is desirable. Since respiratory depression is the most easily demonstrable effect of these drugs, an instrument for measuring the tidal volume was considered. Harbord[1] described an apparatus consisting of a tap by which a single expiration can be deflected into a 600 c.cm. bag. The tidal volume is obtained by estimating the distension of the bag—e.g., a quarter full or half-full. The apparatus described here (fig. 1) is more accurate.

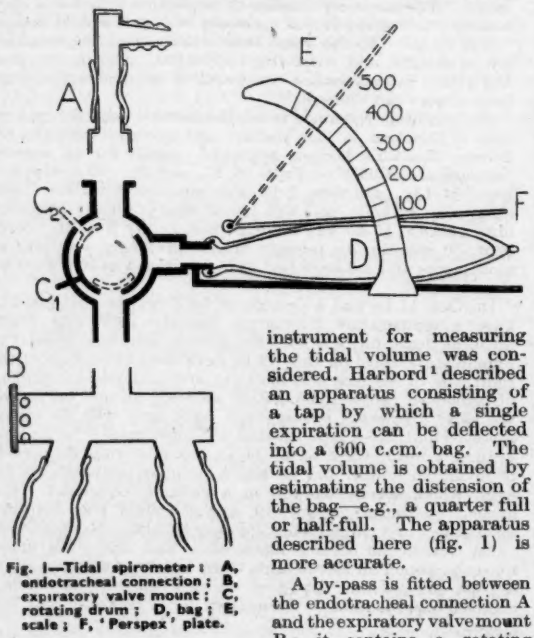

Fig. 1—Tidal spirometer: A, endotracheal connection; B, expiratory valve mount; C, rotating drum; D, bag; E, scale; F, 'Perspex' plate.

A by-pass is fitted between the endotracheal connection A and the expiratory valve mount B; it contains a rotating drum moved by a lever C. When this is in position 1 the patient's respirations pass to and from the anæsthetic machine; when the lever is in position 2 respiration takes place in and out of a 600 c.cm. bag D. A hinged 'Perspex' plate F resting on the bag moves up and down with the respiration, and a calibrated scale E is provided along which the movement of the plate can be read.

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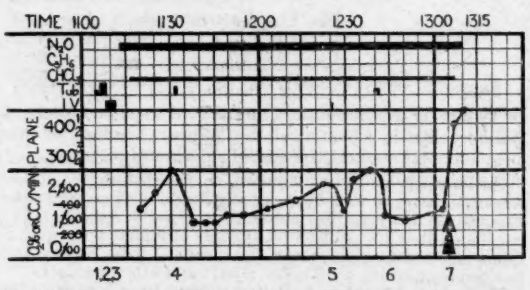

Fig. 2—Upper portion of Nosworthy chart. Numbers on left, in sections "plane" and "O_2%" have been altered to show tidal volume in c.cm.: this is given by lowest curve. Injections: 1, tubarine 5 mg.; 2, tubarine 15 mg.; 3, thiopentone 0·75 g.; 4, tubarine 10 mg.; 5, thiopentone 0·2 g.; 6, tubarine 7 mg.; 7, prostigmin 2·5 mg., atropine gr. 1/75.

When in use the spirometer lies beside the patient's head; if covered by the drapes these can be raised for the short time required. Anæsthesia is maintained in the usual way; the additional dead space is 50 c.cm. To measure the tidal volume the lever is moved into position 2. If this is done at the end of inspiration, an expiration will be caught in the bag; but it is better to press the reservoir bag on the machine while the lever is moved, to be sure that the spirometer bag will not collapse during inspiration, for this would give a false measurement. It is generally sufficient to observe two or three respirations; the lever is then moved back to position 1 and the anæsthetic is continued. The circuit must be airtight, and a cuffed tube is best, but the instrument can be used with a face-piece if this fits closely. In this way estimations can be made at the bedside. The instrument can also be placed on the anæsthetic machine, between the reservoir bag mount and the corrugated tubing, when the semi-closed technique is in use.

The tidal volume can be measured at regular intervals—e.g., between blood-pressure estimations. The respiratory rate should be counted at the same time in case it is desired to know the minute volume. The tidal volume can be charted on the Nosworthy card in the spaces marked "plane" and "O_2%." An example (fig. 2) is

given of a record made during a partial gastrectomy, and the effects on the tidal volume of injections of 'Tubarine,' thiopentone, and 'Prostigmin' are shown.

When this instrument has been used, an increase in the tidal volume has always preceded the return of muscle tone, and can be taken as an indication for a further injection of muscle relaxant. The intensity and duration of the effect of the previous dose is of assistance in estimating how much more to give.

Thanks are due to Dr. John Gillies for his encouragement and assistance; the spirometer was made by Mr. J. P. Morison of the department of anæsthetics, Royal Infirmary, Edinburgh.

C. T. BARRY
M.D. Paris, D.A.

Reviews of Books

Virus and Rickettsial Diseases

S. P. BEDSON, F.R.C.P., F.R.S., professor of bacteriology, London Hospital; A. W. DOWNIE, M.D., professor of bacteriology, University of Liverpool; F. O. MACCALLUM, M.D., director of the virus laboratory, Central Public Health Laboratory; C. H. STUART-HARRIS, F.R.C.P., professor of medicine, University of Sheffield. London: Edward Arnold. 1950. Pp. 383. 24*s*.

The Pathogenesis and Pathology of Viral Diseases

Symposium held at the New York Academy of Medicine, Dec. 14–15, 1948. Editor: JOHN G. KIDD. New York: Columbia University Press. London: Oxford University Press. 1950. Pp. 235. 32*s*. 6*d*.

An Introduction to the Study of Viruses

K. M. SMITH, F.R.S., director of the plant virus research unit, Molteno Institute, Cambridge. London: Pitman & Sons. 1950. Pp. 106. 10*s*. 6*d*.

THESE three books on viruses are all handy volumes, written by experts, and well produced. But there the similarity ends.

Bedson and his colleagues deal with only the virus diseases of man, and try "to present a coherent readable account rather than an exhaustive treatise." In this country their book will be by far the most useful of the three. The main facts are all there for senior students, bacteriological and public-health workers, and clinicians who want to keep up to date in this subject, and though the book is not primarily intended for those working on viruses it will be helpful to them nevertheless. The scene is apt to change between the writing of a book and its publication, and probably the authors would today be less hopeful about the use of ultraviolet irradiation as a means of destroying hepatitis virus in plasma, and would say something about poliomyelitis in relation to inoculation, and more about the Coxsackie viruses. Epidemic keratoconjunctivitis, however, seems to be the only important human virus infection omitted. The four introductory chapters, three of them by Professor Bedson, are particularly good.

The book on virus pathology edited by John Kidd will appeal to a smaller circle, mainly of laboratory workers: but it is full of good things. R. E. Shope discusses the spread of viruses, illustrating his story particularly by references to some of the epidemiological puzzles he has himself helped to solve; T. F. Anderson gives a stimulating account of adsorption co-factors in infection of bacteria by 'phages; and Wyckoff's descriptions and pictures show beautifully developments in the field of virus electron micrography. Most of the other chapters are illustrated by well-produced photomicrographs, showing such things as the pathological changes caused by yellow fever, and various neurotropic viruses. A chapter on cardiac lesions contains some little-known data; and Kidd himself writes well on proliferative lesions caused by viruses.

In the third book Dr. Kenneth Smith has had the idea—theoretically sound—of treating side by side the viruses attacking plants, animals, and bacteria. He deals adequately with the plant viruses, but his knowledge of animal viruses is sporadic. The virus field is now so extensive that no one author can hope to cover the whole of it.

Primary Carcinoma of the Vagina

R. G. LIVINGSTONE, M.D., formerly member resident staff, Gynæcological Division, Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York City. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1950. Pp. 73. 15*s*.

IN 20 years, only 110 cases of this form of cancer were collected at the Memorial Hospital, New York—representing a low incidence, as reported elsewhere. Clinical findings are well described in this little book, and the relative incidence of genesis from different parts of the vagina is given. The notes on treatment by radiotherapy are of little use because of the failure to indicate the dose of irradiation received by the tumour. Surgical treatment is now advised, but no long-term results are yet available. The 5-year survival was 8 out of 85 cases, a figure resembling that usually quoted for this type of cancer, which for some reason is much harder to treat than cancer in the adjacent cervix.

Health and Disease in the Tropics

CHARLES WILCOCKS, M.D., F.R.C.P., director, Bureau of Hygiene and Tropical Diseases. London: Oxford University Press. 1950. Pp. 200. 15*s*.

DOCTORS, whether they are practising in the tropics or not, will find this book useful; but it is written primarily for the lay administrator, the non-medical missionary, and in fact for anyone who lives in or proposes to live in a tropical country. The administrator, whether in government service or commerce in the tropics, has to have a much greater knowledge of medical subjects than his counterpart in temperate zones, partly because he may at any time find himself out of reach of medical aid, and partly because health—his own, his family's, and that of people for whom he is responsible—needs much more care than in a country with a well-organised public-health service. Dr. Wilcocks opens and ends his book with homilies on collaboration: all departments must work together, and to do that each must understand the point of view and difficulties of the others. After a very simple exposition on the causes of disease, he discusses groups of diseases. Treatment is given in outline only; nowhere is the reader encouraged to treat himself, and in some instances special warnings are given of the danger of attempting this. There are useful chapters on housing, water-supplies, drainage, and public health. A section on organisation and personal protection concludes this sensible and informative book.

Therapeutic Radiology

GEORGE WINSLOW HOLMES, M.D., former radiologist in chief, Massachusetts General Hospital; MILFORD D. SCHULZ, radiologist at the hospital. London: Henry Kimpton. 1950. Pp. 347. 52*s*. 6*d*.

THE opinions expressed in this book, the authors tell us, are very largely those of the tumour clinic of the Massachusetts General Hospital. They have limited the discussion of radium therapy to ancillary procedures: where there is a choice between radium and X rays the method using X rays has been described. Bearing this limitation in mind, readers will find much to interest them in this description of radiotherapy as practised in a major American centre. An early chapter, illustrated by coloured photographs, of the effects of röntgen rays on the living cell, shows the striking effects of excessive dosage—which may seem premature to the reader who has not yet been told the biological dosage recommended at the centre. The choice of dose and technique is considered fully later, but the use of dose-in-air is allowed to confuse the calculation of depth-dose in relation to skin-dose. The sections on the treatment of tumours in various sites are sound. The emphasis is rightly on surgery for cancer of the breast, but the condemnation of preoperative X-ray therapy seems rather sweeping. For cancer of the oral cavity X-ray therapy is advocated in sites where radium is probably the better alternative; and in the chapter on diseases of the central nervous system the treatment of medulloblastoma is said to be merely palliative, though this tumour can be cured in the sense that patients have survived ten years without recurrence. The importance of radium therapy for cancer of the female genitalia is recognised,

though with the method recommended serious high-dosage effects are likely to follow. In general, some first-class accounts of clinical cases and the processes of malignant disease are not supported by good descriptions of radiotherapeutic techniques.

Cell Physiology and Pharmacology

J. F. DANIELLI, professor of zoology, King's College, London. London: Elsevier, Cleaverhulme Press. 1950. Pp. 150. 24*s*.

THIS valuable book gives much information tersely yet readably. The author, with considerable success, attempts to integrate biophysics, quantitative biochemistry, and quantitative pharmacology at the cellular level. The work is based on a series of lectures delivered at University College, London, and directs attention to factors which are important for students of drug action. It is not intended as an exhaustive study of the place of cell physiology in pharmacology.

Documenta Ophthalmologica

Editors: F. P. FISCHER, Utrecht; A. J. SCHAEFFER, Los Angeles; ARNOLD SORSBY, London. Vol. IV. The Hague: Uitgeverij Dr. W. Junk. 1950. Pp. 362. Dutch guilders 36 (or £3 7*s*. 11*d*.).

THE present volume is dedicated to Prof. Karl Wessely on his 75th birthday. It also carries news of the death of F. P. Fischer, one of the editors, at the early age of 52. It is to be hoped that this loss will not affect the excellence of this series of academic work.

Outstanding in this volume are a critical analysis of the quanta theory of vision by M. A. Bouman, and a detailed record of twin research in ophthalmology by P. J. Waardenburg. An extensive review of fundamental principles involved in the local application of ophthalmic drugs is given by A. J. Schaeffer, whose contribution is apparently a first instalment of a comprehensive survey of principles of ocular pharmacology. Shorter studies on visual purple by Katharine Tansley, on protein deficiency by G. B. Bietti, on lighting and vision by R. G. Hopkinson, on tonometry by J. S. Friedenwald and R. Moses, and on protective glasses in welding by G. A. W. Rutgers are all critical reviews.

Psychiatric Sections in General Hospitals

PAUL HAUN, M.D., assistant professor of psychiatry, Georgetown University Medical School. New York: Architectural Record. 1950. Pp. 80. $4.

Dr. Haun points out that architects in the United States have often treated the psychiatric section of a general hospital as an afterthought. He describes the various stages through which the architects and the psychiatrists should consult their way towards a satisfactory, if not ideal, unit.

Approaching the matter from a functional rather than a structural standpoint, he considers all the phases of admission, examination, special investigation, nursing, and treatment which a patient will pass through, and then indicates how these purposes can be served. The outcome of his way of looking at the architectural problem is a series of clear guiding principles, and considerable flexibility in their application. This flexibility is effectively demonstrated in his systematic critical appraisal of eight designs for psychiatric wards in general hospitals, submitted by architects to the Veterans Administration. The plan of each of these is shown, and first the desirable and then the undesirable features of the central area (or administrative offices), the "disturbed nursing unit," and the "quiet nursing unit" are listed below it, with reasons. It is noteworthy that in these modern designs, reflecting the requirements of the most advanced American psychiatrists, a hydrotherapy unit and a solarium are never lacking: a roof garden is also customary, though the patients enjoy the use of occupational and similar facilities provided for the orthopædic and other patients on the lower floors. The book contains also an interesting set of plans for a complete six-floor general hospital, drawn up by two well-known New York hospital architects.

Though it will be long before we can hope to use these precepts and examples here in any but a few favoured instances, it is valuable to have the book, since it contains much that is suggestive for smaller psychiatric units of the kind that our hospitals will doubtless have to establish before long.

A Manual of Cardiology (2nd ed. Philadelphia and London: W. B. Saunders. 1950. Pp. 355. 25*s*.).—This pocket-size book gives clearly and soundly the essentials of cardiology. Prof. T. J. Dry provides some of the information in tables or lists, but elsewhere his style is very readable. Common conditions get pride of place, but there are short accounts of such rare conditions as amyloidosis and scleroderma. One or two small errors have crept in, but in the main the little manual is outstandingly good of its kind.

Whitaker 1951 (83rd annual vol. London: Whitaker. Pp. 1156. 12*s*. 6*d*.).—This, the largest Whitaker yet printed, has recovered its pre-war promptness: the new volume appeared before the old year died. It casts its net as wide as ever, ranging from stamps to stars, from weights to weather, and from films to high finance. The Festival of Britain has an article to itself, and is supported by sections on places of historic interest in our chief cities; and London's cathedrals and churches, too, have found their way back. Medical and academic readers will be gratified by the return of a list of Oxford and Cambridge professors: since 1939 we have been without this convenient inventory. Perhaps we may hope that next year the learned clerks of London University will be added.

Lipidoses: Diseases of the Cellular Lipid Metabolism (2nd ed. New York and London: Oxford University Press. 1950. Pp. 595. 96*s*.).—The difficulty of making pure preparations of the fats and lipoids, and the chemical similarity of the various fatty acids found in them, has always made the study of these substances a formidable task. Nevertheless immense progress has been made, and the chemistry of the fats and sterols has largely been elucidated, though there is still much to be learnt about their intermediate metabolism. Progress has not been so rapid in the study of the lipoid dystrophies, though a great deal of work has been done on them in the last ten years. The second edition of Prof. Siegfried J. Thannhauser's book reviews this progress in the light of older work. The opening chapter deals with the physiology and chemistry of the fats and allied substances, discusses their absorption from the gut, and summarises the steps by which the fats, proteins, and carbohydrates may be converted one into the other within the body. The greater part of the book is devoted to the problems in lipoid metabolism presented by the xanthomatoses, Gaucher's disease, and the Niemann-Pick syndrome. Von Gierke's glycogen-storage disease is also included by virtue of the associated hyperlipæmia and occasional secondary xanthomas found in the skin. Much of the detail is supplied by the author's own case-records and chemical investigations. The book, a mine of information, is well illustrated by photographs, coloured plates, and photomicrographs, and the statements made are supported by numerous references.

D.D.T. and Newer Persistent Insecticides (2nd ed. London: Chapman & Hall. 1950. Pp. 632. 50*s*.).—The first edition of this handbook was published in 1946 and contained numerous references to work completed in 1945. In the present edition, however, there are very few references in the text later than 1946—though the authors, Mr. T. F. West, D.SC., and Mr. G. A. Campbell, have appended a bare list of later references. Nevertheless, the book has doubled in size, mainly owing to thorough revision and numerous new passages. The sections on the manufacture and chemistry of D.D.T. contain more useful data on its solubility in various liquids, its chemical and physical stability, its chemical estimation, and the composition of the technical grades. A valuable list is given of the various analogues of D.D.T., with notes on their insecticidal activity. The chapter on formulation includes methods and formulæ which did not appear in the first edition, and these data are all set out in a practical way. The authors have collected much information on the toxicity of D.D.T. to mammals, but this would be easier to follow if it had been arranged under subjects. Two defects of D.D.T., first noticed in 1947, are omitted. One is the irritant action on mosquitoes of D.D.T.-treated surfaces, noted by Kennedy, and considered by Muirhead-Thomson to interfere with control of *Anopheles gambiæ*; the other is the appearance, in many countries, of house-flies highly resistant to D.D.T. There is a useful chapter on γ-B.H.C. but only rather inadequate information on other new insecticides. This subject, however, is moving continuously and it is impossible for a textbook to be entirely up to date. Criticisms of this new edition fade into the background behind its substantial advantages.

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* *Reference: Guy's Hospital Gazette, Oct. 7th, 1950, p. 380.*

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THE LANCET

LONDON : SATURDAY, JAN. 27, 1951

This Influenza

THIS winter's epidemic of influenza bids fair to be the most extensive Britain has had since 1937—perhaps since 1929. The weekly death-roll in the 126 great towns in England and Wales has risen steeply from 54 in the week before Christmas to 102, 458, and now 890 in the week ended Jan. 13; the figures will presumably go still higher, and the steepness of the recent rise is disturbing. So far, however, the fatal cases have been mainly in the over-55 age-group and very largely confined to people already suffering from cardiac or other chronic illnesses. In Merseyside the death-rate is approaching its 1918–19 levels, but there is no suggestion in this epidemic of a high mortality among young adults such as was seen in 1918–19, despite the contrary reports in some newspapers.

Thanks to the international studies of the last few years we can understand a good deal about the background of this epidemic. Influenza virus A is always apt to cause more widespread trouble than virus B. Since 1947 the older A strains have been replaced all over the world by a serological variant called A-prime, which was first detected in Australia in 1946 and in 1947 caused outbreaks in America and to a less extent in Britain and Sweden. In 1948–49, information and strains of virus sent to the World Health Organisation World Influenza Centre in London made it possible to trace the spread of a virus right across western Europe. This, too, was an A-prime strain, slightly different from that of 1947. Starting apparently in Sardinia in the autumn of 1948, the virus soon reached continental Italy, whence it spread to Austria, Switzerland, France, northern Spain, western Germany, and the Low Countries. About New Year, 1949, it reached Britain, and so on to Denmark and Iceland. Sweden and Ireland were just touched but hardly affected, and Britain was less affected than most of the Continent, perhaps because of her experience of a similar A-prime virus in 1947. In June, 1950, local outbreaks of influenza due to an A-prime virus were reported in central Sweden. On previous occasions such local summer "flurries" have been followed by an autumn outbreak in the same area; so a special watch was kept and batches of experimental vaccine were prepared against the Swedish strain. Sure enough, in November influenza appeared in Scandinavia—first in rural Denmark, then in northern Sweden, and soon in Oslo and all over Scandinavia. The fact that the first appearance of the present epidemic in Britain was in Newcastle just before Christmas makes it likely that this had a Scandinavian origin. Also in mid-December, influenza appeared in Belfast and northern Spain. It is still a matter for speculation whether the Merseyside outbreak came from Belfast. There seem at any rate to have been at least three foci of origin—Scandinavia, Belfast, and northern Spain. The infection is now spreading to Eire, up into Scotland, south to London, and (perhaps from Scandinavia) into Germany, Belgium, Holland, and France; also from Spain to southern France. Iceland and Greenland are affected, probably again from Scandinavia. Since Britain and Scandinavia suffered less than the rest of the Continent in 1949 they might be expected to be relatively harder hit this time. It will be interesting to see whether the United States become involved; they had a good deal of influenza last year when we had none, and their herd-immunity may still be valid. Practically all the major European influenza this year is of the A type, the viruses isolated up to now being A-prime strains. No clinical infections of the classical severe type have been reported as yet.

With proper perspicacity the newly formed general practitioners' section of the Royal Society of Medicine had planned a discussion on influenza for January 17. It was only too clear there that the vast body of knowledge about the influenza viruses built up in the last eighteen years has done little to solve the immediate problems of general practice. Dr. E. P. SCOTT, who opened the discussion, even brazenly suggested that influenza was "a disease of doubtful ætiology" (but perhaps he was deliberately "trailing his coat"). Discussion centred largely on the differential diagnosis of influenza by clinical criteria from other febrile illnesses; for it was generally agreed that during an epidemic almost anything is liable to be diagnosed as flu. It still does not seem to occur to clinicians to make use of the specific serological tests for influenza. It is true that these tests are not applicable to diagnosis in the first few days of fever; but after ten days, when the doctor may be getting worried, they might well be helpful. Considerable argument followed Dr. C. H. ANDREWES's plea for the abandonment of the misleading term "gastric flu"; Sir HORACE EVANS and others agreed that gastro-intestinal symptoms may occur in influenza but that epidemics predominantly gastro-intestinal probably have nothing to do with true influenza. Speakers differed on the advisability of using antibiotics or a "sulphonamide umbrella" in the more serious cases: most were against their indiscriminate use. It appears that, as in 1949, penicillin may be disappointing in fulminating cases, especially where staphylococci cause a complicating pneumonia.

Current opinion on virus-vaccines seems to be roughly this. Where a formolised vaccine against the prevailing type of virus infection is available it will give some, but not 100%, protection. With better facilities for following the country-to-country course of an epidemic, in future years we should know fairly definitely, as we have this year, what type to expect. The problem is then largely economic. A monovalent vaccine is likely to be better than a polyvalent one. Ideally, manufacturers should keep stocks of vaccines against all the main types so that they can issue the appropriate one as soon as an epidemic threatens.

But that may mean scrapping big stocks of unwanted types, for types may keep changing. We are then faced with the insistent question of cost and the worthwhileness of amassing huge stocks of vaccine to provide temporary protection against a relatively mild and still rather unpredictable disease.

Besides its practical interest to all of us, influenza virus is a useful tool for those unravelling the more academic tangles in the relation between viruses and cells. In his report for 1950 on the Walter and Eliza Hall Institute in Melbourne, Professor BURNET—whose new knighthood is acclaimed everywhere—has much to say about this. An intriguing part of his work is that which suggests gene-recombination, or hybridisation, between two influenza viruses with different properties. In this country, Dr. L. HOYLE [1] has described more experiments supporting his stimulating but still unorthodox views on the life-cycle of the influenza virus.

Ætiology of Anencephalus

A GRAVE and relatively common defect like anencephaly might be expected to stir the imagination of research-workers. But until lately neither this nor any other of the recognised fœtal malformations received much attention; ten years ago it was almost true that the last word on the subject had been said by BALLANTYNE [2] in 1902. Then in 1939 Australia was swept by an unprecedented outbreak of german measles, with an unusually high incidence in adults, and it was not long before GREGG [3] spotted the relation between the involvement of pregnant women in this outbreak and the secondary wave of congenital cataracts appearing in his patients in Sydney, N.S.W. When the affected children became old enough for hearing defects to be detected the relationship was extended, by SWAN and TOSTEVIN [4] in Adelaide and by GREGG himself, to congenital deaf-mutism and heart lesions. The Australian observations were soon confirmed in the United States and in England, and the general recognition that maternal rubella in the early weeks of pregnancy could interfere with embryonic development initiated little less than a revolution in medical thought. Malformations believed to be unavoidable are now gradually approaching the category of preventable diseases. Moreover, clinical evidence [5] of the significance of maternal ill health in the causation of fœtal deformity is supported by the experimental findings in animals—for example, malformations in the offspring have been produced by subjecting the mother to vitamin lack,[6] injection with dyes,[7] exposure to radiation,[8] and, more recently, anoxia.[9]

In the face of this formidable array of facts, the influence of genetics in the production of many abnormalities has seemed less important than formerly. However, evidence has been accumulating in favour of a genetic origin for anencephaly [10 11] and congenital hydrocephaly [12] in man, and this is supported by the experiments showing that chromosome translocation induced by radiation can produce anencephaly in mice.[13] Preconception irradiation of mothers or fathers does not seem to produce any monsters in the offspring,[14 15] but it does not follow that there has been no gene change in the irradiated parent. The mutations induced may have been recessive, or, if dominant, may have been incompatible with development beyond a very early stage.

The environmental causes of malformations are also being sought for by a method that owes much to the pioneer work of STILL [16] and the insistence of HOGBEN [17] on the value of statistics in social biology. The statistical studies of MALPAS,[18] MURPHY,[19] and PENROSE,[20] on the effects of maternal age and birth order drew inspiration from these sources. Precise conclusions on the significance of "advanced" age in the mother and primogeniture have, however, been difficult to reach, because of the lack of information on the distribution of such variables in the general population or other controls. The statistical ætiology of malformations of the nervous system has been intensively studied in Birmingham by Professor MCKEOWN and Dr. RECORD, who report some of their findings in this issue. Recent papers from Birmingham have illuminated many obscurities left by previous investigations. Thus, the chances of a second malformed child being born to a mother who has had one child with severe malformations of the nervous system can now be estimated more accurately. The importance of primogeniture as a contributory cause of anencephaly and spina bifida has been established securely, and maternal age has been shown to be significant in congenital hydrocephaly. In their present contribution MCKEOWN and RECORD draw attention to the remarkable differences in seasonal incidence shown by anencephaly but not by other types of malformation. Anencephalic births are commonest in December and rarest in June and the influence of season is most apparent among firstborn infants. The difficulty of finding control data has still not been completely overcome, since official returns do not classify births in each month by maternal age and parity separately; but precautions have been taken to avoid errors of biased sampling.

Seasonal fluctuations are commonly evident in statistics of morbidity and mortality, and many are without satisfactory explanation. The cause of the higher incidence of anencephalic malformations among embryos conceived in the month of March or thereabouts might be related to the prevalence of some maternal infection in April or May, to diet, to allergy, or perhaps to abnormal activity of pregnant women during spring-cleaning. Whatever the true meaning of the phenomenon, it should add one more environmental factor to the ætiology, and consequently improve the prospect of finding means of prevention.

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Discovery in the Blood

THERE is nothing more boring than the chronological presentation of history—even medical history—as a series of unrelated incidents. When learned men show it to us, the thread of history is real enough; but it is sometimes tangled, often hard to find, and at its distal end buried beyond recovery. Dr. ROBB-SMITH is bold, therefore, in writing the history of those observations and guesses, false and true, by which addisonian anæmia was recognised, studied, and at length changed from a fatal disease to a relatively benign one.[1] His essay is also timely; for it is not a moment too soon to record MINOT and MURPHY's discovery in relation to the accepted thought of the day. Nothing fankles the thread more than the reminiscences of the elderly.

Like all historians who lack the courage of LIVY or the author of *Rule Britannia*, ROBB-SMITH has sketched-in the background of the picture. ἀναιμία was used in Classical and Hellenistic Greek as meaning "an absence of blood"—e.g., in those animals which lack a red respiratory pigment—and as an adjective was sometimes applied to the pallor of a patient. When the word reappeared in the 18th century its meaning had changed very little, and as late as 1835 it was defined by BABINGTON [2] as "a deficiency of the quantity of the circulating fluid." It had in fact not occurred very clearly to anyone by this date that there might be a distinction between the quantity and quality of the blood, or, more accurately, between the blood volume and the relative amounts of the constituent parts. The blindness of our forebears was no greater than our own; but it is odd that in the heyday of phlebotomy, when observations were published on the fibrin content, the "buffy coat," and even the specific gravity of the blood, nobody seems to have noticed, or thought worthy of comment, the relative proportions of cells and plasma. Priorities a hundred years ago are hard to allot, but by 1843 ANDRAL had seen these and other things and put them on paper.[3] Anæmia as a shortage of red cells, perhaps of hæmoglobin, was recognised. Within thirty years increasing knowledge of chemistry and some technical ingenuity had given us prototypes of the apparatus used today for counting cells and estimating hæmoglobin. Not one anæmia but many were recognised—far more than appear in a modern textbook. Their treatment lagged behind; but the last years of the last century and the first of this were a barren period in therapeutics. (Can anyone explain the use of arsenic in anæmia?) Except in the hands of EHRLICH, improvements in staining technique probably had a retrograde effect, since they focused attention on the fascinating but often sterile morphology of the circulating cells. The renaissance of hæmatology—which some think reached its climax at the International Congress at Cambridge this summer—is probably too near our time for us to appreciate its significance; but it appears to owe its origin to a new appreciation of the functional aspects of the blood to which the physiologists had drawn attention. The patient may be anæmic because his body cannot make enough blood, or because it loses more than it makes; but the purpose of the erythron is the transport of oxygen to the tissues and for its failure to do this the patient suffers.

From the vantage of a hundred years it is not difficult to see why addisonian anæmia was not earlier identified as a disease sui generis, and not impossible to understand its confusion with what we now call Addison's disease. If ADDISON and his contemporaries learnt less from their necropsies than we might expect, we must in justice remember how often the modern pathologist defers his ex-cathedra statements until he has had the aid of the microscope. Out-patient halls must have been filled, as they are today, with weary, breathless, pallid patients; if we think how many of these are diagnosed without reference to the laboratory we shall find it easier to see ADDISON's confusion in its proper light. Unless we soak ourselves in the medical literature of the period it is beyond the powers of most of us to appreciate the limits of his knowledge and ignorance; but, since the difficulty persists today, we can understand how the art of bedside diagnosis depended on an oral and visual tradition only too easily obscured by the written word. Actually, within six years of his paper on Anæmia—Disease of the Suprarenal Capsules,[4] ADDISON, helped and spurred by Sir SAMUEL WILKS, produced his monograph in which he made a distinction between the cases of anæmia per se and those of adrenal insufficiency, though (since to him pallor meant anæmia) he still believed that anæmia was a part of the latter syndrome.[5] Much of the progress of medical knowledge last century lay in the differentiation of hitherto confused entities, and if the modern tendency has been to employ OCCAM's razor somewhat ruthlessly we should not withhold our admiration from those whose eyes and memories sorted like from unlike among their patients. Every hospital has its golden age, and there were great names at Guy's in those days—ADDISON, BRIGHT, HILTON, HODGKIN, and the ebullient WILKS. We like to think that this clarification of thought came from the coffee-housing of thoughtful colleagues, in consultation on an obscure "case," or walking home through the gloomy streets of the Borough.

Final definition of addisonian anæmia came with further observations at the bedside, and the application of quantitative methods to hæmatology which culminated in the work of another Guy's man, PRICE-JONES [6]; but the credit for associating this disease with a characteristic cell, the megaloblast, as an objective diagnostic criterion, must rest with EHRLICH.[7] Meanwhile their symptoms, their histological appearances, and their supposed ætiology were all brought into the attempts to distinguish and classify the many varieties of anæmia. Some responded to treatment with iron, some did not; but addisonian anæmia, Biermer's anæmia, pernicious anæmia, in spite of temporary natural remissions remained a fatal disease. Its treatment with liver was the second therapeutic landmark in the years between the wars, and advance since then has lain in the successive refinements which ended in the isolation of vitamin

1. Robb-Smith, A. H. T. *Oxfd med. Schl Gaz.* 1949, **1**, 73, 88; *Ibid*, 1950, **2**, 53.
2. Babington, B. in Todd's Cyclopædia of Anatomy and Physiology. London, 1835.
3. Andral, G. Essai d'hématologie pathologique. Paris, 1843.
4. Addison, T. *Lond. med. Gaz.* 1849, **43**, 517, 562.
5. Addison, T. On the Constitutional and Local Effects of Diseases of the Suprarenal Capsules. London, 1855.
6. Price-Jones, C. *J. Path. Bact.* 1922, **25**, 487.
7. Ehrlich, P. *Verh. Ges. Charietärzte*, Dec. 9, 1880.

B_{12} as the factor necessary for cure. Yet we are not sure whether the most appropriate name for this ailment is not still that which PYE-SMITH gave it in 1883, the "idiopathic anæmia of Addison."[8]

If the numerous references given by ROBB-SMITH are arranged in decennial groups, it will be seen that three of the decades—1840–49, 1870–79, and 1920–29—contain as many papers of fundamental importance as all the others put together. They correspond respectively with the high tide of the French clinical school and its repercussions in other lands, with the technical improvements of hæmocytometer and hæmoglobinometer, and with the new light brought by MURPHY, MINOT, and WHIPPLE to a subject obscured by excessive attention to static morphology. It is no new idea that knowledge advances not inch by inch but in sudden and exciting bounds; but nobody can say where the advance will come next. It is a matter of opinion whether the next phase in hæmatology will be one of expansion or of mere consolidation. We shall not emulate the BARTLETT brothers in prophecy.

Annotations

RUSSIAN PSYCHIATRY

THE *Journal of the American Medical Association* recently deplored the fact that in the present world situation the publisher of a book on Soviet psychiatry should need to apologise to public opinion for producing it. No such apology, one would like to think, is called for with the appearance here of copies of Wortis's collection of facts and documents on the state of Russian psychological medicine.[9] English science, and particularly English psychiatry, are undoubtedly concerned to understand both their Soviet counterparts and Russia as a culture-pattern, and the too brief period of friendly contact during the war suggested that neither, given the opportunity of contact, would prove incomprehensible. The increasingly paranoid character of international relationships—and of international stereotypes—has also made a psychiatric and anthropological picture of the Soviet culture, its standards, and its motivations, highly urgent for all of us, and a study of Russian psychiatry which gave us a full picture of mental health in the Soviet Union, of the cultural attitude of medical science there, of the political background, and of the philosophical and sociological forces involved, would not fall far short of a complete psychosocial study of Marxism-Leninism in action.

Wortis's book is a heroic attempt to give a just account of the mind and practice of Soviet society as seen through its psychiatry. As a collection of documents, bound together by a commentary which might be headed "how life appears to the intelligent Marxist," it is both informative and fairly comprehensive. Yet in a society where conscious politicism and (Western sociologists would say) the unconscious forces which underlie it have been pressed so far and so fast, it is virtually impossible to assess psychiatric practice and ideas without wide discursions into general sociology, and without seeing the culture-pattern in action. The author of this book, though he learnt Russian, was prevented by the Berlin crisis from visiting the U.S.S.R., and his work might therefore have been called "Soviet Psychiatry as Reflected in the Literature." Read as it stands, the picture is naïve: read, however, against the background of other studies, such as Crankshaw's *Russia and the Russians*, or Prof. E. H. Carr's history of the Russian revolution, the documents at least are highly informative, especially those which deal with the radical change in the Soviet attitude towards marriage, discipline, sexual standards, education, and the validity of psycho-analytical concepts, which coincided roughly with the Stalin Constitution. Admirable as Wortis's attempt at a strictly factual picture may be, it is difficult to assess Soviet mental health without reference to its public manifestations—on the one hand the remarkable endurance of the war years and the hardships and achievements which preceded them, and on the other hand the outbreaks of paranoia against Trotskyists. We should be obliged to consider factors like these in any assessment of our own society; and in dealing with one less familiar it is all the more necessary. Wortis's own assessment is perhaps indicated by his comment that "a deep conviction in the power of reason is strikingly illustrated by the complete absence of a literature on the psychology of propaganda in the U.S.S.R."

From the documents, a very clear picture of Russian psychiatric thought does nevertheless emerge. In general it is Pavlovian, functional, based on a far more definite dogma of the mind-body relationship than our own, intensely conscious of its social context. Its therapeutics make full use of the integrative effects of work and social purpose, which are the strongest psychological cards of any order based on a strong corporate ideology: in one case-report we find a child-therapist using controlled projection against an outside enemy (the Germans) as a deliberate outlet for fear and hate arising from the experiences of the occupation. The Russian attitude to Freudian and post-Freudian theory is very close to that of the more sceptical English eclectic, or even the older general practitioner, though it substitutes ideology for "common sense" as a ground for its scepticism. The sexual orientation of Communism is an important marker for the social psychologist. After a brief period of rather wild experiment this has become increasingly similar to that of the English middle class. Homosexuality was made punishable in 1947; divorce by consent was ended earlier. Capital punishment, after being abolished, was reinstated "by overwhelming public demand" for offences involving treason and sabotage.[10] The interposition of attempts at reconciliation before the courts between would-be divorcees may foreshadow a line of development in our own divorce law. Giliarovsky's statement on normal sexual development[11] sounds remarkably familiar:

> "Because psychological sex interests may often develop before physical sex maturity, precocious sexuality should be discouraged. We cannot consider it normal for an adolescent of 14 to 16 to have practical experience in sex matters . . . from the point of view of mental hygiene it may be regarded as generally undesirable for sex practices to begin before the age of 17 or 18. It is desirable that sex relations, as far as possible, take place without contraceptives and with a view to conception. . . . It is extremely important that the sex act produce complete psychological as well as physical satisfaction. . . . There is no reason to believe that sex abstinence in itself can cause any serious mental disturbance, let alone a psychosis. . . ."

The book contains little on the bitterly debated subject of the Soviet penal system.

On the credit side, the successes of Russian psychiatry are essentially the successes of Communism. The bitter political struggles and economic hardships of the early days, the struggle over collectivisation, the purges of the '30s, and the appalling character of the Nazi invasion, have not succeeded in destroying the morale or the dynamic appeal of Communism; and Russian psychiatry, in exploiting the integrative powers of the ideology, can

8. Pye-Smith, P. H. *Guy's Hosp. Rep.* 1883, **47**, 219.
9. Wortis, J. Soviet Psychiatry. Baltimore, 1950.
10. Karpinsky, V. The Social and State Structure of the U.S.S.R. Foreign Languages Publishing House, Moscow, 1950.
11. Giliarovsky, V. A. *Psikhiatria*, Moscow, 1942.

effect a synthesis of medicine and social outlook which is far harder to achieve in any culture that has a less intense sense of social purpose. These successes have been gained at the price of intellectual rigidity, and of the forfeiture of the critical approach to psychosocial medicine and to the dynamics of power on which we in Western cultures today pin much of our hope of social progress. There is no doubt, however, that such an ideology provides, to the young in particular, a source of enthusiasm comparable to that derived from the major proselytising religions, and very similar in structure. Perhaps the rudest shocks to those unacquainted with Soviet scientific polemics (or with the theological debates of the English Puritans) come from the appendices to Wortis's book, containing criticism of psychological textbooks on the grounds of objectivity vis-à-vis the class struggle.

Psychiatry in England can learn much, both from the refusal of Marxist psychiatry to dissociate social, political, and mental health, and from the history, successes, and blemishes of Communism in practice. It is on every count essential that we should understand modern Russia, and that we should do so as scientific observers, despite the difficulties imposed by the suspicions and the propaganda of both sides in the present international tension. For this reason if no other, Wortis's book is valuable to all interested either in psychiatry or in political psychodynamics.

FAMILY STUDIES IN CHILD HEALTH

THE increasing emphasis on child health is one manifestation of the importance now attached to preventive medicine. The conception of long-term field studies of the child in his natural environment is fairly new. The most notable are those being conducted in Newcastle upon Tyne by Sir James Spence, and in Luton by Dr. R. M. Dykes, with their respective teams. These projects are already yielding a rich harvest of facts which will prove of great value in framing enlightened health policies. Dykes [1] reviewed the health of the 1498 infants born in Luton in 1945 who could be observed throughout the first year (these comprised 79% of the total births) and showed that constitutional factors greatly influence child health, and also that the infant-mortality rate is a more sensitive index of social standards than the infant-morbidity rate.

The carefully planned domiciliary study of the child which is being carried out in Newcastle is probably the most comprehensive of its kind ever to be undertaken. The objects and methods of this investigation were described in Boston last year by Spence,[2] who discussed some of the data yielded by the first year's work. After tracing the evolution of "preventive pædiatrics" and mentioning the importance of medical statistics, hospital pædiatrics, and laboratory research, he emphasised that much further progress can be made by field workers who go outside the hospitals into the community, to study the incidence and spread of disease, the effects of social conditions on disease, and the control of disease and promotion of health by social environment. He deprecated the idea that field work is something entirely divorced from clinical and laboratory medicine, and suggested that a considerable proportion of those who work in social medicine should be clinicians and laboratory workers who follow their problems into the field when necessary. He pointed out that field inquiries are laborious, diffuse, and difficult to control with scientific standards—these are indeed the main reasons for their former neglect. He also asserted that, although research on some aspects of social medicine concerned with family life can best be conducted by a general practitioner who lives in the community as the family doctor and keeps records of each individual from year to year and from one generation to another, the isolated inquiries of a general practitioner are applicable only to limited subjects; moreover, few general practitioners have the time, training, or inclination for such work. For particular purposes such as those which the Newcastle workers are pursuing, efficient organisation and team-work are necessary.

The Newcastle city health authorities have shown themselves anxious to coöperate with the university department of child health, the children's hospitals, and the laboratory services in field research to improve child health. An initial coöperative investigation into the causes of infant mortality in Newcastle in the year 1939 was directed by Miller.[3] The most notable finding was wide disparity between notified causes of death and actual causes as revealed at necropsy—a finding that indicates the inaccuracy of vital statistics relating to causes of death in infancy. A domiciliary study of morbidity in the first eight years of life was inaugurated in 1947; the work was greatly helped by the team spirit and technique evolved during the earlier mortality investigation. The main object was to observe, against the background of the home, the acute infective illnesses of young children—their incidence, clinical types, and results. Other objects were to bring those working in wards and laboratories into daily contact with field workers, thus broadening their concepts of health and disease; to provide relevant local facts with which to freshen clinical teaching; to guide health programmes; and to create a method for giving a contemporary picture of disease, verified by statistics and direct clinical observation, which would reveal new problems for research. It was decided to study from the day of birth a sample of 1000 infants—one-sixth of Newcastle's annual births. Altogether 1142 infants, born in May and June, 1947, were selected, representing a cross-section of all social groups. The team of investigators consisted of one pædiatrician who devoted most of his time to the research; two more senior pædiatricians for consultation; two clerks; and five specially trained health visitors, who were entrusted with much of the intimate observation and research. Each week's collected material was discussed at a Saturday conference attended by the medical officer of health and others concerned. As Spence aptly remarked, this study of 1000 infants inevitably became a study of 1000 families.

Although this investigation has not yet reached the half-way point it has already yielded much valuable information. The records show in detail how 1000 families drawn from all social classes live, how they react to the problems of life, how they avail themselves of the health services, how the children are nurtured in body and mind, what their activities are, and the relation of these to others in the family. By the end of the first year 967 (85%) of the children remained in the investigation; 44 had died, and 125 had removed from the city. In only 6 instances had coöperation been lacking. The study is now in its fourth year. The main object of pursuing it for eight years is to study the familial pattern of disease, particularly respiratory conditions. It is already apparent that the intrafamilial method of clinical investigation yields a simultaneous view of infectious disease—notably subclinical varieties—in other members of the family which could not otherwise be studied. Regular tuberculin testing is revealing exact information about the tuberculisation of the group.

From this work Spence has already drawn the broad conclusion that over-emphasis on diagnostic medicine

1. Dykes, R. M. Comparative Study of Infant Sickness and Infant Mortality in Luton. Luton, 1950. See *Lancet*, 1950, i, 453.
2. Spence, J. C. *New Engl. J. Med.* 1950, **243**, 205
3. Miller, F. J. W. *Lancet*, 1942, ii, 269.

diverts attention from the detailed study of the sequence of clinical events that make an illness; and that a scientific study of this sequence of events, minutely observed and carefully recorded, is the method of the natural scientist which becomes a powerful instrument in the training of the young clinician. Such a broad approach to the study of life—particularly child life—is like a breath of fresh air in these days of ultrascientific medicine when many students, and their teachers, cannot see the wood for the trees.

BEDPAN EXERCISE

As a labour-saving device the bedpan is a total loss. Patients have known this all along, and the news is now reaching the doctors, and even a few of the hospitals. Dr. J. G. Benton, Dr. Henry Brown and Dr. H. A. Rusk [1] have lately been measuring the energy expended by patients on the bedpan and comparing it with that expended on the bedside commode. They studied the oxygen consumption of patients in these two situations by means of a closed-circuit metabolism apparatus. Since there were psychological and other obstacles to the study of patients during actual defæcation, the subjects were asked to "bear down" 10 times when seated first on the bedpan and later, after a rest, on the commode. The tests were conducted in a small quiet room and the patient was screened off from the doctor, who could nevertheless observe him through a crack. Of the 28 patients studied 15 had cardiac conditions, and the remainder were either normal or had other disorders. The tests showed that in all patients there was a consistent greater oxygen consumption for performance on the bedpan than on the commode, and that there was no improvement with practice. The rise above resting levels was, in the cardiac patients, 50·7% higher on the bedpan than the commode, and in the other subjects 48·4%. This finding confers the blessing of science on the universal opinion of those who have used a bedpan. If we wish to spare patients, and especially cardiac patients, we will give them a bedside commode; if we wish them to use half as much energy again we will insist on the bedpan.

NEUROLOGICAL COMPLICATIONS OF DISSECTING ANEURYSM

WITH dissecting aneurysms of the aorta neurological involvement is not uncommon, and its presence may help in diagnosis. In 1944 Weisman and Adams [2] described 11 confirmed cases of dissecting aneurysm with prominent neurological dysfunction. This was associated with ischæmic necrosis of the peripheral nerves, the spinal cord, or the brain. With necrosis of the peripheral nerves the circulation through the main artery of the limb was impeded, with a pulseless cold extremity, weakness, anæsthesia, and loss of tendon reflexes. When the blood-supply of the spinal cord was affected a transverse lesion of the cord developed rapidly, with flaccid paralysis, sensory impairment up to a spinal level, and loss of sphincter control. Impairment of the cerebral blood-supply resulted in hemiplegia often accompanied by confusion, stupor, or coma, and at times a "carotid hemiplegia" with blindness on the side opposite to the hemiplegia. Weisman and Adams showed that the cause of the neurological disturbance was either extension of the dissection into one of the major branches of the aorta (such as the common carotid artery) with occlusion of the lumen, or severance of the smaller branches of the aorta by the dissection; this was the commoner cause of interference with the blood-supply of the spinal cord. Moersch and Sayre [3] have analysed the Mayo Clinic records of 26 verified cases of dissecting aneurysm. Clinical neurological signs were present in 12, but probably this does not truly reflect the incidence of neurological complications, since 9 other patients died so suddenly that neurological examination was impossible. They found ischæmic lesions of the spinal cord and brain but no convincing evidence of peripheral-nerve lesions.

These studies indicate that dissecting aneurysm of the aorta is a possible diagnosis when a sudden cerebral or spinal disturbance is associated with other symptoms such as severe pain in the chest or abdomen, perhaps radiating to the back. It is of historical interest that probably the first recorded patient with a dissecting aneurysm and cerebral involvement was King George II who "was found fallen on the ground, speechless and motionless," [4] and in whom post-mortem examination showed a dissecting aneurysm of the ascending aorta.

ANIMAL OR VEGETABLE?

FOR some of us the true tragedy of Kongwa lies not in the sad loss of £36 million but in the harm that the failure may do to other projects which demand something more than a parochial outlook on food problems. We are told there is nothing so shy as a million dollars, and a million dollars once bitten can be expected to be twice shy. There are others who feel the most recent reduction of the meat ration as another tragedy. It is useless to point out to such people that they have available, often quite cheaply, abundant supplies of animal protein in such forms as milk, cheese, fish, and the rabbit or hare. For them "protein" means a pre-1914 steak.

Things being as they are, the Nutrition Society could not have chosen a more topical theme for its symposium in London on Jan. 20 than the comparative merits of animal and vegetable foods. Problems relating to the supply of food have a fascinating complexity. As D. A. Boyd showed, cost in money, man-power, and acreage must be balanced against the value of the foods as sources of energy, protein, vitamins, and "waste products" which can be utilised to provide more foods. By setting the balance more correctly, we are now producing for human consumption nearly twice as much vegetable food as before the late war. Animal products have also been increased in total amount, despite large reductions in imported feeding materials. The dairy cow, which needs little protein in its diet because it can synthesise amino-acids in its rumen, is largely responsible for this increase. K. L. Blaxter has calculated that the cow can take, from cereal, residues of which a high proportion are inedible by man, and manufacture from them, and yield in its milk, enough lysine to make up for the shortage of this amino-acid in the original cereal. The cow needs much attention, but repays the extra cost of labour by the high value of its produce. Other creatures such as the hen need even more attention, and, as K. J. Carpenter pointed out, must be provided with rations rich in well-balanced protein. Such a diet is usually costly, but the cost can be reduced by the skilful mixing of proteins from different sources. This is what we do for ourselves when we insist on a "good mixed diet." G. R. Tristram showed that many plants, if they were eaten entire, would provide at least a good mixture of amino-acids. It is the specialised organs such as the seed which have the incomplete mixtures.

If the protein in the diets of newly weaned children is inadequate the syndrome of kwashiorkor, or malignant malnutrition, may appear. Dr. Lucy Wills has obtained excellent results by treating this disease with large amounts of the protein of dried skim-milk. Cow's milk and other agents reported to cure the disease may act

1. *J. Amer. med. Ass.* 1950, **144**, 1443.
2. Weisman, A. D., Adams, R. D. *Brain*, 1944, **67**, 69.
3. Moersch, F. P., Sayre, G. P. *J. Amer. med. Ass.* 1950, **144**, 1141.
4. Nicholls, F. *Phil. Trans. roy. Soc. London*, 1761, **52**, 265.

by virtue of their specific amino-acids or the vitamin B_{12} which all of them probably contain. Some experimental and theoretical evidence which supported this concept was advanced by Dr. R. F. A. Dean. He has fed children with mixtures of soya and various cereals, and is convinced that diets could be constructed exclusively from plant sources, on which young children could grow rapidly and remain healthy. His mixtures lacked vitamin B_{12}; he has found that the addition of this improves their nutritive value for rats, and it would probably improve their value for children. The mixtures were given their original scientific trials by Miss Harriette Chick, who suggested that many similar mixtures had great possibilities, especially in child nutrition. Even protein-free extracts of some plants have, it seems, remarkable powers of supplementation when added to plant proteins.

The meeting demonstrated the broad range of the modern science of nutrition. Scientific knowledge is often many years in advance of its application to human purposes. Do our administrators and their financial advisers realise that in nutrition the need to apply our knowledge is urgent?

TOO FEW BEDS

THE London Local Medical Committee has published a resolution urging "that in view of the amount of illness at the present time, unprecedented since the start of the National Health Service, and the consequent increased need for hospital accommodation in London for acute cases, every step should be taken to provide beds by all possible means." Among the means suggested are exclusion from hospital of normal maternity cases, postponement of non-urgent operations, and temporary crowding of wards.

Certainly the incidence of sickness is now unusually heavy. Dr. Frank Gray, secretary of the committee, points out that one in three of the cases offered to the Emergency Bed Service is not admitted to hospital. This is a serious matter, though fortunately the chances of getting a patient admitted are better than this ratio suggests, since the doctor commonly makes arrangements directly with the hospital; indeed the service is only provided as a means of helping doctors when direct approach has failed. Inquiry of the service shows that in the first week of January applications for admission of acute cases were 32% higher than at the start of last year. There were 1792 applications, with 1058 admissions; the number admitted is actually greater than in the same week of 1950, owing, no doubt, to the gradual increase in the number of staffed beds. During the same week the service received 571 applications for admission to infectious-disease hospitals, and about the same proportion were admitted. This is the first time since the start of the N.H.S. that there has been any serious difficulty in gaining admission for patients with infectious diseases. This difficulty is due primarily to the unusually high prevalence of infectious diseases, and notably of measles; but probably it is due also in part to the recent appropriation of infectious-disease hospitals for general use.

Except for the closing of maternity wards to normal confinements, the remedies suggested by the London Local Medical Committee are already being put into operation. The regional boards have called for a reduction in the intake of cases from waiting-lists, and many hospitals have spontaneously started crowding their wards. Whether in the long run this is a wise step remains doubtful. In some large hospitals it has an evil reputation, and the gain in the numbers of nursing staff achieved through determination not to overwork nurses should not lightly be endangered. Perhaps by next winter criteria for definite stages of emergency could be worked out; at each stage a definite degree of overcrowding would be called for, and this would equally definitely be cancelled as soon as the emergency passed. Such a system would ensure that the willingness of nurses was not exploited unnecessarily.

RELIEF OF POSTOPERATIVE PAIN

THE anæsthetic used to be the worst part of having an operation, but now the focus of dislike has changed to the postoperative period. Pain, particularly after abdominal and thoracic operations, is the worst feature of this period, and its relief must be a first concern. The favourite remedies are morphine and its synthetic substitutes (which were discussed in our leading article last week); but their value is sometimes offset by such undesirable side-effects as respiratory depression and vomiting. Many alternatives have been suggested; two very promising ones are intravenous procaine and intravenous alcohol. With each of these two methods, however, careful supervision is necessary if overdosage is to be avoided. Now Blades and Ford [1] suggest another rather novel method of relieving postoperative pain, which they have used successfully after thoracotomy—an operation commonly followed by severe pain. Fine plastic tubes made of 'Aeroflex' are placed along the edge of each of four ribs bordering the incision. The tubes are held in place with a few fine sutures, and the end of each tube is brought out at the anterior angle of the wound. Through these tubes, 2 ml. of procaine solution is injected every two to three hours. At the same time morphine is given, if necessary, for its euphoric effect. These workers are convinced that the procaine injections produce very great and hitherto unobtainable relief. Pain disappears immediately after the injection, and the patients are able to move about in bed; and earlier ambulation is possible. The tubes are left in situ for nine days, and the wounds heal well and without infection.

MR. BEVAN AND MR. MARQUAND

THE new Minister of Health, unlike Mr. Aneurin Bevan, will not be a member of the Cabinet. Some may welcome this as evidence that the health services are being taken out of politics; but in the next few years, when Defence will demand an increasing share of the national resources, we may have cause to regret the loss of influence that Mr. Bevan's departure entails. Mr. H. A. Marquand, however, may prove an able advocate of efficient medical care, and he comes to the Ministry at a time when a fresh mind and a conciliatory disposition can do much good. His chief task is to improve the balance of the service by giving more weight to the needs of public health and general practice—if only because failure to meet these needs is partly responsible for the strain on the hospitals. As will be seen from the brief biography we print on p. 243, he brings to these problems a valuable experience not only of economics but of human relations and of social services; and he has won approval at the Ministry of Pensions. It remains to be seen whether the N.H.S. will gain or lose by the removal of housing from the control of the Minister of Health: when a change of this kind has been debated and resisted for years it is somewhat irritating to have it made overnight, to facilitate a Cabinet reshuffle, and without detailed consideration of the consequences. As has been sensibly suggested, a logical sequel to the present changes might be the union of the Ministry of Health with the Ministry of National Insurance in a Ministry of Social Services—over which Mr. Marquand (elections permitting) would be well qualified to preside. Meanwhile, he has more than enough on his hands without asking for more. The medical profession will earnestly wish him success in what he has to do.

1. Blades, B., Ford, W. B. *Surg. Gynec. Obstet.* 1950, **91**, 524.

Special Articles

A SOCIOMEDICAL STUDY OF TWO HUNDRED HOSPITAL MEDICAL PATIENTS

JOHN PEMBERTON
M.D. Lond., M.R.C.P.
SENIOR LECTURER IN SOCIAL MEDICINE, UNIVERSITY OF SHEFFIELD

THE following study was undertaken with two general aims: (1) to find out how a random sample of teaching-hospital medical outpatients and inpatients fared after discharge from hospital, and (2) to assess what part environmental influences had played in the ætiology of their illnesses. The wards and outpatient department concerned dealt with all general medical illnesses except diabetes.

METHODS

It was decided to try to obtain detailed sociomedical records of 100 outpatients and 100 inpatients. To this end, a letter was sent to an unselected consecutive series of 146 outpatients and 144 inpatients, whom I had examined one year previously, asking them to come to the hospital for a follow-up examination. In the case of inpatients who had died in hospital, the letter was sent to the nearest relative. In response to the letter, 100 outpatients, 88 inpatients, and near relatives of 12 inpatients who had died came to the follow-up clinic. The distribution of the commoner diagnoses among the 47 outpatients and 43 inpatients who failed to attend was similar to that among the patients who were investigated, except that 9% of the non-attenders had cancer compared with 1% of those who attended, and 7% of the non-attenders had pulmonary tuberculosis compared with 1·5% of those who came.

Each patient who attended the follow-up clinic had a consultation lasting about three-quarters of an hour. The diagnosis was reviewed, the outcome of the illness assessed, and a detailed account of the social environment obtained. This included an occupational history since leaving school, details of economic status, diet, housing conditions, leisure activities, and a family history. The patient was also asked about his childhood, his married and working life; and an attempt was made to assess the quality of his more important human relationships. The interviews were conducted in private, and all but one or two of the patients willingly gave all the information required. I was often impressed by the additional light thrown on these medical cases by privacy and adequate time. To supplement the case-history, a relative was interviewed separately in 29 cases; in 8 cases a visit to the home was made; and in 10 cases the patient's place of work was inspected.

TABLE I—DISTRIBUTION OF THE 290 PATIENTS BY AGE AND SEX

—	Years							
	0– %	10– %	20– %	30– %	40– %	50– %	60– %	70 + %
Male (161)	0·6	3·7	13·0	20·0	27·3	19·9	13·0	2·5
Female (129)	0·8	7·7	14·7	26·4	22·5	17·0	8·5	2·4
Total (290)	0·7	5·5	13·8	22·8	25·2	18·6	11·0	2·4

GENERAL PICTURE OF MEDICAL ILLNESS IN A TEACHING HOSPITAL

Age and Sex

For this part of the analysis, the 90 patients who failed to attend because of death or some other reason have been added to the 200 who attended, thus making a consecutive unselected series. The whole group contained 144 inpatients and 146 outpatients. The age and sex distribution of the group is shown in table I.

Diagnosis

Table II shows the diagnoses of the 290 patients. The commonest illnesses found, including cases with multiple diagnoses, were: peptic ulcer and non-ulcer dyspepsia* 23%, psychoneurosis 13%, pneumonia, bronchitis, and bronchiectasis 8·3%, essential hypertension (including its complications such as cerebral thrombosis) 8·2%, rheumatic heart-disease 4·8%, rheumatoid arthritis 4·1%, and pulmonary tuberculosis 3·1%. The primary diagnoses were classified under the following headings:

TABLE II—DIAGNOSES OF THE 290 PATIENTS

Somatic		Psychosomatic		Psycho-neurotic	Psychotic	Multiple diagnoses
Rheumatic heart-disease	12	Peptic ulcer	33	28	Schizophrenia 1	20
Cancer	11	Dyspepsia	33		Suicide 2	
Bronchitis, emphysema, and pneumoconiosis	9	Essential hypertension (including coronary disease 4, cerebral thrombosis 1, malignant hypertension 1)	23			
Pulmonary tuberculosis	9	Rheumatoid arthritis	11			
Nephritis	5	Asthma	8			
Lobar pneumonia	4	Nervous diarrhœa	5			
Bronchiectasis	3	Spastic colon	4			
Pernicious anæmia	3	"Rheumatism"	4			
Thrombophlebitis	2	Thyrotoxicosis	4			
Hydronephrosis	2	Ulcerative colitis	2			
Tænia saginata	2	Migraine	2			
Cirrhosis of the liver	2	Fibrositis	5			
Miscellaneous (single cases)	30	Epilepsy	2			
		Miscellaneous (single cases)	7			

	Somatic %	*Psycho-somatic* %	*Psycho-neurotic* %	*Psychotic* %	*Multiple diagnoses* %
146 outpatients	18	57	17	1	7
144 inpatients	46	41	4	1	8
290 all patients	32	49	10	1	8

These categories tend to merge into each other, but it was considered worth attempting to separate them to obtain a clearer idea of the ætiology of the different illnesses.

For grouping the psychosomatic cases, Halliday's classification (1943) was largely adopted and his definition used as a guide: "a bodily disorder whose nature can be appreciated only when emotional disturbances—i.e., psychological happenings—are investigated in addition to physical disturbances—i.e., somatic happenings." The most important diseases included in the psychosomatic group were peptic ulcer and non-ulcer dyspepsia, essential hypertension, "rheumatism," spastic colon, nervous diarrhœa, ulcerative colitis, and hyperthyroidism. The psychoneurotic group included those patients whose symptoms consisted mainly in a morbid degree of anxiety and who showed no evidence of a physical disorder.

The dominating importance of psychosomatic and psychoneurotic illness in current medical practice was confirmed in this series of cases.

Duration of Illnesses

Table III shows that approximately four-fifths of the 200 patients who attended the follow-up had had symptoms of their illness for more than a year before coming to hospital. A third had had symptoms for five years or more.

* "Non-ulcer dyspepsia" covers patients referred to the hospital as possible cases of peptic ulcer in whom there was no radiological evidence of ulcer, and no reflex cause of dyspepsia, such as chronic cholecystitis.

TABLE III—DURATION OF SYMPTOMS BEFORE COMING TO HOSPITAL IN THE 200 WHO ATTENDED

—	Years					
	0–1	1–2	2–3	3–4	4–5	5+
100 outpatients .	17	29	15	1	3	35
100 inpatients ..	23	31	5	8	3	30

Results of Treatment

It is perhaps inaccurate to describe the health of a patient a year after receiving treatment recommended at a hospital as the result of that treatment. His improvement or deterioration in health is often due to more potent causes. The patient's present condition was assessed mainly on his own and, where possible, a relative's report, unless these conflicted with the results of physical examination. If a new complaint had developed, this also was recorded. The so-called results of treatment are tabulated in table IV.

It will be seen that in the whole outpatient group, 17% were assessed as cured, 48% improved, 24% about the same, 7% worse, and 4% dead. In the inpatient group, the figures were: 22% cured, 31% improved, 16% about the same, 11% worse, and 20% dead. Perhaps the most significant finding was that about three-quarters of all these patients still had their original complaint; they had neither died nor been cured of it. Of the 200 who attended, 36 had developed a new complaint. Three-quarters of these 36 patients had passed from one psychosomatic or psychoneurotic complaint to another,

TABLE IV—RESULTS OF TREATMENT IN THE 200 PATIENTS WHO ATTENDED AND THE 53 WHO REPLIED BY LETTER

—	Cured	Improved	Same	Worse	Dead	New complaint
% of 128 outpatients	17	48	24	7	4	16
% of 125 inpatients	22	31	16	11	20	13

a point which was made by Ryle (1939) in the Goulstonian lectures on the visceral neuroses. It seems that in many illnesses the "disease" is a necessary component of the patient's adaptation to his environment and to get rid of the disease either the "patient as a person" or his environment must be changed.

RELATIONS BETWEEN ILLNESS AND SOCIAL ENVIRONMENT

The results of treatment of many of these medical illnesses were disappointing. The detailed inquiry into the social history was undertaken to try to ascertain the contribution to the ætiology of the illnesses made by environmental and hereditary influences and the extent to which the illnesses might have been prevented by healthier living conditions.

Often, of course, it was impossible to assign an environmental or hereditary cause to the illnesses with any certainty. In a good many cases a combination of more than one environmental cause, with or without an inherited susceptibility, was no doubt responsible. Environmental conditions to which especial attention was paid were occupation, housing, nutrition, the use of leisure, and human relationships. Table V shows the cases in which one of these factors seemed to be of dominant ætiological importance.

Unhealthy occupational conditions were judged to be the main cause of illness in 5·5%, bad housing conditions in 3·5%, inadequate diet in 0·5%, misuse of leisure in 1·0%, and unsatisfactory human relationships (in which inherited disposition may have been an important factor) in 43·5%. There were no cases of known hereditary disease, but in 9% of the cases hereditary factors were considered important ætiologically. In 46%, there was no *apparent* environmental or hereditary cause of the illness. If anything, the numbers assigned to each main ætiological category have been underestimated, for only the more obvious cases were included.

Occupation

The 11 cases in which the patient's occupation was judged to be the chief cause of the illness are shown in table VI. All but 1 were men. The exception was a woman who developed lead-poisoning on taking up war work at the age of 65. There were 4 cases of silicosis or miner's pneumoconiosis, 3 of chronic bronchitis and emphysema, 2 of gastric ulcer, and 1 of dyspepsia.

TABLE V—ENVIRONMENTAL AND HEREDITARY INFLUENCES AS MOST IMPORTANT ÆTIOLOGICAL FACTORS

—	Occupation	Diet	Housing	Leisure	Faulty human relationships	Heredity	No apparent environmental or hereditary cause
100 outpatients	6	0	2	1	52	0	39
100 inpatients	5	1	5	1	35	0	53
Total % ..	5·5	0·5	3·5	1·0	43·5	0	46

Diet

Only 1 case in the series was obviously due to a deficient diet. The patient was a bachelor, aged 60, who had scurvy. He had given up work about six months before and did his own cooking on a gas-ring in the single room where he lived. He did not bother to cook any vegetables.

There may have been other cases in this series where a poor diet was an important ætiological factor; in some of the infective illnesses perhaps, in the 12 cases of rheumatic heart-disease, or in the 9 cases of pulmonary tuberculosis. Without an accurate analysis of the diet before the onset of the illness it was impossible to assess its importance. In 2 cases of dyspepsia the rushed conditions under which the meals were eaten seemed to be important.

TABLE VI—OCCUPATION AS CHIEF CAUSE OF ILLNESS

Sex	Age	Diagnosis	Occupation
F	65	Lead-poisoning	Painting. Poor cleansing facilities
M	44	Miner's pneumoconiosis	Coalminer (ripper) for 20 years
M	38	Miner's pneumoconiosis	Coalminer (ripper) for 17 years
M	55	Silicosis and bronchitis	Gannister crusher, 30 years
M	65	Miner's pneumoconiosis	Coalminer (ripper) for 19 years
M	55	Chronic bronchitis and emphysema	Coalminer for 21 years
M	55	Chronic bronchitis and emphysema	Hot drop-stamper. Exposed to dust, gases, fumes, and big temperature differences
M	71	Chronic bronchitis and emphysema	Street hawker
M	34	Gastric ulcer	Foreman, responsible for rapid construction of aerodrome runways in early part of the war
M	45	Gastric ulcer	Doing two jobs. Police war reserve 8 hours a day, and commercial traveller the rest
M	55	Stress dyspepsia	Doing three jobs. Coalminer, small-holding, and keeps a shop

TABLE VII—BAD HOUSING AS CHIEF CAUSE OF ILLNESS

Sex	Age	Diagnosis	Housing
F	16	Rheumatic fever	7 sleeping in two bedrooms. No bath; outside w.c.; damp ceilings falling
F	14	Rheumatic fever	Shares bedroom with her 5 sisters. No bath; outside w.c. Damp
M	17	Nephritis	12 sleeping in two bedrooms. No bath; outside defective w.c.
M	10	Bronchiectasis following 2 attacks of pneumonia	Condemned back-to-back slum house. 4 in one bedroom. Outside w.c.
F	12	Acute nephritis	Rural slum house. Very damp. 11 share three bedrooms. Outside midden
M	48	Anxiety state and essential hypertension	Living in his mother's house. Wife and mother do not speak to each other
M	25	Nervous dyspepsia	Living in in-laws' house. 10 of them in all

Housing

In 7 (3·5%) of the cases bad housing was considered the chief cause of the illness. The diagnosis and housing of these cases are listed in table VII.

The homes of the 2 patients with rheumatic fever and the 2 patients with nephritis listed in the table were visited. All 4 were overcrowded and insanitary. The families were large and a large proportion of the brothers and sisters had had illnesses of the streptococcal or pneumococcal group (table VIII).

One of the patients, a girl, L.M., aged 14 (rheumatic fever), lived in a house which was one of a terrace of four-roomed slum houses, about eighty years old. The front room opened on to the street and was used as a bedroom by Mr. and Mrs. M. Mrs. M., who had diabetes and a colostomy following an operation for carcinoma of the rectum, was in bed. The floor of the back kitchen had dropped about 2 in. below the wainscot and the rain came in above the lintel of the door. The water-supply to the house was through one slow-running cold tap over the kitchen sink and the w.c. was at the back of the house across the yard. In the back bedroom was one bed where the two boys slept. One of these also had rheumatic heart-disease. In the front bedroom, the six sisters, including the patient, slept in two double beds. There were no sheets or pillow-cases, no floor coverings, and no furniture in the bedrooms other than the beds. Each of the rooms measured about 10 by 8 ft. The patient and her brother who had rheumatic heart-disease gave a history of repeated attacks of tonsillitis and quinsy.

Most of the illnesses in which bad housing was considered the chief cause resulted from infection, but the last two cases (table VII) showed how the psychological strain of crowded housing conditions can aggravate or cause illness.

Mr. J.N., aged 25 (nervous dyspepsia), was living with his wife and one-year-old baby in lodgings when first seen. The diagnosis was nervous dyspepsia which he had had for about one month. His wife was pregnant, and, because of this, they had been asked by their landlady to find other accommodation. When seen a year later, he was still getting bouts of epigastric pain. The four of them were now living at his mother-in-law's house with her and his brother-in-law's family of five. There were three bedrooms and an attic. He, his wife, and his two children slept in the attic. He said the baby's crying got on his mother-in-law's nerves, and she had told them to leave. He went to bed at 7 or 8 P.M. to get out of the way.

This patient was a sensitive conscientious man whose mother had died when he was 3. It is possible that a more robust personality might have remained well in his circumstances, but it is equally likely that if he and his family could have had a house of their own he would not have become ill.

Leisure

There were two patients with chronic alcoholism, both of whom had had venereal disease. Misuse of leisure might be regarded as the chief cause of their illnesses. In both, however, there were also potent psychological causes.

Mr. W.E., aged 64, lost his mother when he was 10, and his father remarried when he was 17. His father was a heavy drinker. The patient acquired gonorrhœa at 17, resulting in his present urethral stricture. He became a heavy drinker in early adult life and developed delirium tremens during the pneumonia for which he was admitted to hospital.

Mr. W.L., aged 51, had very strict parents. He joined up at 17 in the 1914–18 war and acquired syphilis soon after. Had gonorrhœa and has been treated for urethral stricture. Discharged from the Army with neurasthenia. Has been drinking heavily ever since. He is a steel-painting contractor and says he is spending £3 10*s.* a day on drink. He was in a state of great anxiety about his heart when seen, although, apart from a systolic pressure of 170 mm., nothing abnormal was found. He produced the following letter which he said a doctor in another town had given him three years before:

> Dear Mr. L.....
> I examined you today. You are suffering from a serious disease of the heart, threatening paralysis. You are only fit to do light work if at all.
> .....L.R.C.P.

This letter had, I think, aggravated his anxiety state.

Heredity

There were no cases of known hereditary disease in this series. However, 6 of the 8 patients with asthma, 5 of the 28 patients with peptic ulcer, 5 of the 17 cases of psychoneurosis, and the single cases of mental deficiency and psychosis gave a positive family history

TABLE VIII—ILLNESSES OF BROTHERS AND SISTERS OF TWO CASES OF RHEUMATIC FEVER AND TWO CASES OF NEPHRITIS IN WHICH OVERCROWDING WAS CONSIDERED THE CHIEF ÆTIOLOGICAL FACTOR

Rheumatic fever.			Rheumatic fever.			Nephritis.			Nephritis.		
Family	Age	Illnesses	Family	Age	Illnesses	Family	Age	Illnesses	Family	Age	Illnesses
James	21	Cervical tuberculosis	Barbara	28	Pneumonia	Annie	42	No history	Ronald	14	Rheumatic fever Abscesses Septicæmia Mastoid (twice)
Mabel*	17	Rheumatic fever	Elizabeth	28		Henry	40				
Ernest	15	Pneumonia Bronchitis	Violet	23	Pneumonia	Ernest	38				
			John	22	Erysipelas	Alice	29				
Edna	12	Tubercular abscess	Joyce	18		Fred	27	Rheumatic heart-disease	Roy	13	Recurrent tonsillitis
			Roy	17	Rheumatic fever						
Mary	8	Asthma	Lilian*	14	Rheumatic fever	George	25		Cynthia*	12	Nephritis
Harry	4	Pneumonia Erysipelas	Clara	13	Diphtheria	Ivy	22	Pneumonia Fits	Marion	10	Scarlet fever
			Mary	10	Diphtheria				Mary	8	Scarlet fever
Eric	1	Fits	Spencer	3		Mary	18		Bobby	5	Scarlet fever
			Kathleen	2		Raymond	17	Mastoid	Irene	4	Pyelitis Bronchitis Otitis media
			Sister	3	d. bronchopneumonia	Eric*	16	Nephritis			
			Brother	5/12	d. "wasting"				Olive	2	Pyelitis
									Baby	4/12	d. bronchopneumonia

* Patient.

suggesting inherited susceptibility. Siblings, parents, cousins, uncles, aunts, and grandparents were included in the family inquiry.

Human Relationships

The data about human relationships and ætiology were of necessity largely derived from the patients' own accounts of their lives and illnesses. Although it is difficult to present data of this sort quantitatively, it seemed to be worth attempting so that some sort of estimate, however rough, could be made of the contribution of unsatisfactory human relationships to the ætiology of the illnesses. A special effort was made to assess the importance of emotional insecurity in childhood and of psychological stress before the onset of the illness.

A control group of 81 healthy people was obtained by interviewing random samples of 47 patients from the fracture wards, 7 from a plastic and burns unit, and 27 normal parturient women in a maternity hospital. They were not an entirely satisfactory control group. The sex and the social-class distribution was similar to that of the 200 patients but they were somewhat younger (average age 38 years compared with 42). Also the possibility that a group of accident cases will include more than a normal proportion of psychologically abnormal people cannot be excluded.

Insecurity in Childhood

The factors which were considered most important were persistent quarrelling, drunkenness, unfaithfulness, or violence of one or both parents, and the loss at an early age of father or mother by death or separation. The following cases illustrate relatively clear-cut examples of insecurity in childhood :

TABLE IX—HISTORY OF INSECURITY IN CHILDHOOD

Type of illness	No. of cases	Loss of one or both parents before age 6	Insecure childhood for other reasons	Total
Somatic ..	55	13%	11%	24%
Psychosomatic	109	18%	37%	55%
Psychoneurotic	17	18%	59%	77%
Controls ..	81	12%	11%	23%

Mr. G.S., aged 40 (essential hypertension). Father died when he was 2. Mother remarried when he was 8. Parents separated when he was 14. They were never happy. "My stepfather used to sleep with a razor under his pillow. I was terribly afraid of him. If I saw him coming up the street, I would run in and sit quiet as a mouse."

Miss D.S., aged 31 (rheumatoid arthritis). Mother was in mental hospital, father killed in 1914–18 war. "My youth was anything but happy. I was brought up in an orphanage. You live in an atmosphere of fear all the time wondering whether you are doing right."

Table IX shows the incidence of a history of important causes of insecurity in childhood in the main types of illness and in the control series. Loss of one or both parents before the age of 6 was commoner in the psychosomatic and psychoneurotic groups than in the somatic and control groups but the differences were not, by themselves, statistically significant. The other causes of insecurity in childhood were commoner in the psychosomatic and psychoneurotic than in the other two groups and the differences were statistically highly significant.

Psychological Stress before Onset of Illness

A history of mental stress at, or just before, the onset of illness was significantly commoner in the psychosomatic than in the somatic group—61% compared with 16% (table X). The three most important causes of mental stress at or about the time of onset, which were all significantly more common in the psychosomatic than in the somatic group, were serious illness or death in the family, work anxiety, and sexual or marital difficulties (table X).

TABLE X—HISTORY OF MENTAL STRESS AT, OR JUST BEFORE, ONSET

Type of illness	No. of cases	No. with stress at onset	Commonest types of stress at onset		
			Family illness or death	Work anxiety	Marital or sexual difficulties
Somatic ..	55	9 (16%)	3	0	2
Psychosomatic ..	109	67 (61%)	15	28	8

EXAMPLES

Family Illness

B.R., aged 11 (recurrent vomiting). Attacks came on, six months previously, during the last illness of his father, and cleared up within three months of his father's death.

Work Anxiety

Miss E.P., aged 42 (nervous diarrhœa). Duration one year, since new job in administrative department of a big store. Dealing with complaints about fuel supplies. Got back to her old job as manageress of a shoe department, and the diarrhœa cleared up.

Mrs. L.Z., aged 30 (stress dyspepsia). Mother died at her birth. Adopted. Foster father drank and foster parents quarrelled. Married for ten years; one son aged 7. Husband called up in 1941. She continued to look after their butcher's shop. Dyspepsia came on then. "It was a big strain." Husband came home in January, 1946. When she was seen again in May, 1946, her dyspepsia had gone.

Marital Unhappiness

Mrs. E.K., aged 51 (gastric ulcer). Mother died when patient was 3; stepmother at 8. Father died when she was 11. Patient divorced her first husband because he was unfaithful and drank to excess. Her first bout of pain came on at that time. Second attack of pain came on just after she lost her home and furniture in 1940 through enemy action. She now keeps a theatrical boarding-house and gets the pain when she "rushes round a lot."

Mrs. M.B., aged 51 (toxic goitre). After she had a hysterectomy in 1943, her husband stopped having intercourse with her as he thought her sex life was ended. She suspected that he was being unfaithful and symptoms of thyrotoxicosis began to develop.

On the limited data available, it was not possible to say whether a particular type of stress was associated with a particular type of illness, but some of the figures were suggestive. For example, while only 17% of the 164 patients suffering from psychosomatic or somatic illness gave a history of anxiety arising out of employment at the time the illness began, 46% of the 50 cases of ulcer and non-ulcer dyspepsia gave such a history.

Some of the burdens which seemed to precipitate the symptoms in these ulcer and non-ulcer dyspepsia cases were not abnormally heavy, and no doubt many adults experience similar strains without becoming ill. Serious cause for chronic anxiety in childhood was three times commoner in the histories of the ulcer and non-ulcer dyspepsia group than in the somatic group, and it seems likely that disturbing experiences in childhood had made some of these patients particularly susceptible to stresses in adult life. Davies and Wilson (1937) found that in 84% of 205 patients with peptic ulcer the symptoms began soon after some disturbing event affecting the patient's work or finances or the health of his family. In a control series of 100 patients with hernia, only 22 gave such a history. Davies and Wilson do not mention possible causes of chronic anxiety in the childhood of their patients.

Of the 4 women in this series who suffered from thyrotoxicosis 3 gave a history of marital or sexual anxiety at the time of onset, compared with 8 out of the 109 psychosomatic and 2 out of the 55 somatic cases. The figures, although small, suggest that this type of anxiety may be of importance in the ætiology of hyperthyroidism.

In general the case-histories of this survey support the hypothesis that people who experience chronic anxiety in childhood are vulnerable to psychological stress in adult life and that they are prone to develop psychoneurotic or psychosomatic illness. It is difficult to prove that insecurity in childhood and psychological stress before the onset of illness are important causes of the illness, for we cannot demonstrate the mechanism of such a relationship.

Some workers have, however, shown that emotional disturbances can produce abnormal physical changes in the tissues. Grant and others (1935) showed that urticaria could be provoked through the efferent peripheral nerves when these were stimulated by emotion, and Wolf and Wolff (1943) demonstrated in a patient with a gastrostomy that abnormal physical changes in the gastric mucosa could occur under the influence of fear and anger.

CONCLUSIONS

All the cases studied in this survey were seen in a teaching hospital, and, although they were unselected in the sense that all the available cases in one medical service over a given period of time were included, the group was too small and too heterogeneous to be a basis for conclusions of general validity. The study does, however, confirm that most medical illness referred to a teaching hospital is long-standing or recurrent and that in only a minority of such cases can a cure be expected.

It is therefore pertinent to ask how far these illnesses could have been avoided. Better conditions of housing, nutrition, and occupation, and a higher level of popular health education, could probably have prevented most, if not all, of the cases of tuberculosis, rheumatic heart-disease, nephritis, scurvy, venereal disease, pneumoconiosis, and lead-poisoning, which represented about 10% of the total.

The striking feature of the series was the high proportion of psychosomatic and psychoneurotic illness—59% of all cases. While the bacterial diseases are becoming less important as causes of morbidity and mortality, diseases in which mental and emotional factors are of primary importance demand our attention more insistently. Canby Robinson (1944) in a similar study of unselected cases in the medical service of a teaching hospital concluded that " adverse social conditions cause emotional disturbances in over 50 per cent. of the patients and are the major precipitating cause of illness in about 36 per cent. of the patients."

Halliday (1948) has produced evidence that the incidence of the psychosomatic illnesses is increasing in Great Britain and the United States and that younger age-groups are increasingly affected. The reported relative freedom of primitive people from neurotic and psychosomatic illness supports the hypothesis that conditions peculiar to Western civilisation are to some extent responsible. Gelfand (1948), for example, states that peptic ulcer and coronary disease are rare in the African in Africa, whereas the incidence of peptic ulcer and coronary disease in negroes in some parts at least of America approximates to their incidence in the white population (Lewis 1942).

While a great deal of ill health can be prevented by further improvements in the physical conditions of life, especially those connected with housing and occupation, it is becoming clearer that further substantial advances in preventive medicine will depend as much, if not more, upon improving the emotional and mental environment, especially in childhood.

SUMMARY

Consecutive series of 146 medical outpatients and 144 inpatients who attended a teaching hospital were followed up a year later to assess the results of treatment and to investigate possible social causes of their illnesses.

Of the 200 patients who attended the follow-up 17% of the outpatients and 22% of the inpatients had been cured. The remainder still had their illnesses or had died of them.

In 43·5% of the cases the most important ætiological factor in the social environment seemed to have been disturbed human relationships, in 5·5% unhealthy working conditions, in 3·5% bad housing, in 1% misuse of leisure, and in 0·5% deficient diet. In 46% there was no apparent environmental or hereditary cause of the illness. The combination of emotional insecurity in childhood and psychological stress in adult life seemed to be a common and potent cause in the cases of psychosomatic and psychoneurotic illness.

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MANAGEMENT OF BATTLE CASUALTIES FROM KOREA

R. M. LATTA
M.B. Glasg.
SURGEON COMMANDER, R.N.

DURING the first two months of the Korean war, H.M. Hospital Ship *Maine* carried some 1850 patients to base hospitals in Japan. For various reasons this report of the management of these patients has to be based chiefly on impressions: detailed statistics are not available.

The actual sailing time from Korea to Japan was in the region of forty-two hours; and on some of the trips the patients were on board for about forty-eight hours. On other trips, because sailing was delayed by typhoons in the neighbourhood, they remained on board for up to six days. With few exceptions patients had had primary surgical treatment before embarkation, close to the battle zone and/or at an evacuation hospital. In many cases, however, the records were scrappy and some cases had none at all so that it was impossible to learn the time between treatment and admission to the ship, or the kind of treatment given, even if there had been the necessary time and staff to do this on board. For obvious reasons follow-up of the patients was impossible; but a cross-section of similar cases was seen at a base hospital in Japan, and some idea of the probable results of treatment was obtained.

Such figures as can be given were obtained from the nominal lists which accompanied each load of patients, and absolute accuracy cannot be assured. About 230 cases had major soft-tissue wounds without bone involvement, and 180 had major compound fractures. Some 400 had relatively minor wounds for which no special treatment apart from renewal of dressings was required, and no particular mention will be made of this group. The figures referring to other types of injuries will be given later under the appropriate headings.

In general, the first thing which impressed one was the need of the average patient for food and rest; and considerable improvement was apparent after supplying these two things alone for three or four days. Evacuation of the patient from the front line is now organised to such a degree that he gets little chance of resting, and he may even be snatched away from approaching food. He goes with little pause from front line to dressing-station, dressing-station to field hospital, field hospital to hospital train, hospital train to evacuation hospital, evacuation hospital to hospital ship or aircraft, and so, eventually, to base hospital. With a fair proportion of

patients this itinerary is short-circuited; but those who go through the whole programme arrive travel-weary, quite apart from any wound or injury they may have. Moreover, adequate medical supervision is difficult under these circumstances, and it is possible that a small number of patients may suffer as a result—e.g., by the development of gas-gangrene.

When admitted on board most patients needed only postoperative supervision, and these did very well; but some cases went wrong, and it is chiefly with these cases that this report is concerned.

SOFT-TISSUE WOUNDS

Soft-tissue wounds comprised the largest group of cases. All had had surgical treatment, and all had been given routine penicillin (the usual dose was 300,000 units of procaine penicillin daily or twice daily), while in some cases an antibiotic bomb of penicillin, steptomycin, and 'Aureomycin' had been used.

Out of the 410 cases of major soft-tissue wounds and wounds in which bone was involved, 51 (12%) required further surgical treatment during the short time they were on board. The indications for intervention were the usual ones: local pain, toxæmia, hæmorrhage, unhealthy smell or appearance of the dressing, evidence of gangrene, and so on; but there was a further group of cases in which primary suture had been carried out. In other words, cases in which the surgical treatment had been inadequate or over-optimistic required further intervention.

It was abundantly evident that nothing can yet take the place of the efficiently planned surgical toilet of a wound. The trimming of damaged skin edges, opening up of fascial planes, excision of dead or damaged tissues, removal of foreign bodies (especially those of vegetable origin), and hæmostasis are all essential. Of the value of antibiotic therapy there can be no doubt, but it cannot take the place of surgery in the treatment of war wounds. If surgery is efficient, delayed primary suture or secondary closure with or without skin-grafting can become almost a matter of routine in conjunction with antibiotic therapy; and it was possible to follow this procedure on board in a small number of cases. If, however, surgery has not been efficient, with larger wounds where there has been a good deal of tissue damage further intervention is required, usually as a matter of some urgency; with less severe wounds the antibiotics limit the spread of infection and the development of toxæmia, thereby permitting some delay in instituting surgical treatment without serious deterioration in the patient's condition. The general appearance of such a wound is rather like that of a cold abscess. It is highly probable that a number of such cases were overlooked on board because they were relatively asymptomatic, and there were always enough cases with symptoms to keep one busy.

The inclusion here of primary suture among the reasons for further surgical intervention is open to criticism, which is valid as long as the limitations of primary suture are recognised. If the wound is treated efficiently, and if it can be kept under supervision for the first few postoperative days, primary suture should certainly be considered. But, under the conditions which war imposes, it is not without danger. Front-line surgery cannot always be done under good conditions, and the necessary evacuation of the patient from the front line through the various staging-posts to the base hospital means that he is not under surgical supervision all the time. Because of this, primary suture is not without risk. Two minor tragedies were seen in this series. In both cases wounds of the foot had been closed. Had they been left open both patients would probably have had useful feet; but, as a result of closure of imperfectly excised wounds, there was swelling and tension and spread of infection, and it seemed likely that both feet would eventually have to be amputated. These were the two worst cases seen, but almost every wound which had been closed had to be opened and have further excision done.

GAS-GANGRENE

There were 3 cases of clinical gas-gangrene in this series, involving the legs in 2 and the arm in 1. All 3 had had routine penicillin therapy from shortly after the time of wounding, but primary surgical treatment had not been adequate. In 1 case a mid-thigh amputation was required. In the other case where the leg was involved, there was gangrene of the distal half with proximal extension in the extensor muscle-group; by excising this group it was possible to leave enough tissue to justify a below-knee amputation. For the case in which the arm was affected, dead and damaged tissue was widely excised and the wound left open in the hope of preserving the limb; but amputation was done later since the loss of structure was so widespread that the limb could never be useful. It is known that despite the general use of antibiotics, gas-gangrene developed in cases evacuated from Korea by other methods.

HÆMORRHAGE

For the most part patients were received and disposed of before the time when secondary hæmorrhage usually appears; and, indeed, secondary hæmorrhage should be uncommon if wound toilet has been adequate. Hæmorrhage following primary wound toilet presented a minor problem. In the first place, it seems bad for the patient's morale if he can see a spreading patch on his dressing; and secondly, if the operation has been done elsewhere, there always seems to be some (usually quite unjustifiable) concern that damage to one of the larger vessels may have been overlooked. If there was evidence of continued bleeding for a few hours after admission, the patient was taken to the theatre. As a rule, only persistent capillary oozing was found; but in a few cases there was a definite bleeding-point.

There was one patient with fairly profuse continued bleeding from a wound just below the level of the knee-joint on whom three attempts to stop the bleeding had been made before admission. The fourth attempt, done on board with a rather wider exposure than had been used before, showed that a circle of cortical bone, about 1 in. in diameter, had been chipped off the anterior upper end of the tibia. In this case hæmostasis was secured with Horsley's bone wax; in other cases ligation of a bleeding-point, firm pressure with hot packs, or the application of 'Oxycel' gauze was effective. Diathermy was unfortunately not available.

It was noticed that in several cases the method used to control hæmorrhage at the time of primary operation was to plug the wound firmly with a gauze or soft-paraffin gauze pack. This was effective as far as control of bleeding was concerned, but it interfered seriously with the policy of leaving the wound open, and the plugs had to be removed at the first opportunity. Sometimes, too, the dressings over such wounds were fixed in place with encircling turns of adhesive plaster, which naturally soon became tourniquets. The relief to the patient by dividing this strapping was most noticeable.

It was surprising how often the line of the missile crossed the anatomical line of the main vessels of a limb without involving them. When the major vessels appear to be in the line of fire there is more than one method of dealing with the case. If the wound leads directly to the vessels and there is serious loss of blood, the surgeon has no alternative but to ligate them if repair is impossible. If, on the other hand, there has been no great loss of blood judging by the patient's condition, and the wound track does not expose the vessels, then it may be advisable to leave them undis-

turbed and hope for the eventual formation of a traumatic aneurysm or arteriovenous fistula which can be dealt with later when the collateral circulation is established. But it seems doubtful whether this second policy can wisely be applied to the femoral artery in the lower third of the thigh or to the popliteal artery; for in these areas the formation of a hæmatoma will tend to obstruct by pressure any collateral channels.

3 cases were seen in which the distal third of the femoral artery had been damaged. The wounds, produced by sharp-nosed, high-velocity missiles, were small and did not obviously involve the vessels. The patients were first seen on board with a tense swelling round the lower thigh with ascending gangrene of the leg, and all required mid-thigh amputations. In 2 cases this was done on board; the 3rd is mentioned later in more detail. It would probably have been wiser to explore for possible vascular damage at the time of primary surgical treatment, and, having found it, to ligate the damaged vessels, and to rely on a paravertebral block or reflex dilatation to encourage opening up of the collateral channels. This area of the body is notoriously bad for vascular injuries; and, because of tension, there seemed in these cases to be no possibility of the reserve channels opening up.

With regard to amputations, these were done, whenever possible, at the site of election. Skin-flaps were cut, although sometimes the position of the original wound necessitated slight modifications of the usual anterior and posterior flaps. In infected cases the flaps were brought loosely together over gauze; in the others primary closure was done, leaving a rubber drain in for two or three days.

WOUNDS COMPLICATED BY COMPOUND FRACTURES

Fractures, generally, were treated in padded plasters, and if there was no real complaint they were left alone. The criteria for further intervention were the same as for soft-tissue wounds. Adequate wound surgery is, if possible, even more important than when bone is not involved, and the remarks about the treatment of soft-tissue wounds apply here with equal force.

The standard plasters were used: for femurs a pin through the upper end of the tibia incorporated in a plaster spica was the routine method of fixation, although in the early days a Tobruk splint was commonly used. Handling the patient was much easier when the splint was used, but it did not give the same degree of immobilisation and, therefore, of comfort to the leg. No attempt was made to check radiologically the position of the bone-ends; if the limbs were of equal length and the contours were approximately the same, the position was accepted as adequate until the patient could be given definitive treatment. With regard to plasters in general, two points seem worth making.

The first is that it is desirable, under the circumstances described here, to split the plaster as soon as it is applied. This had not been done with the first patients carried, and it was almost always necessary to do it; it is much easier to to do this at the time of application than later, on a conscious apprehensive patient with a swollen limb. Later on, plasters were being split; but the division must be in the whole length of the plaster, and it should also include any bandages which have been used to fix dressings in place before the plaster was applied.

The second point is that there is a case for the routine description on the outside of the plaster shell of the injuries underneath, preferably using a rough sketch. One patient arrived on board without any notes. He had a laparotomy wound, and a silent abdomen; and he was in a left hip spica which had been extended to include the right thigh. There was nothing to show that this extension concealed a wound of the right thigh, which, as it happened, involved the right femoral artery. The patient did not complain particularly of this leg; he was toxic, but this was thought to be due to the paralytic ileus which he had; and the first indication of the true state of affairs was gangrene of the foot. It is just possible that with a little extra attention his leg might have been saved; as it was, it had to be amputated.

INTRATHORACIC WOUNDS

82 patients with thoracic or thoraco-abdominal wounds were carried. There were 2 deaths in this group. All combinations of pneumothorax and hæmothorax, both unilateral and bilateral, with and without injury to the lung, were observed. All these patients had been treated before embarkation; but the majority of them were in an unstable state and required careful and constant supervision. Most of them arrived on board with one or more intercostal catheters connected to water-sealed drainage-bottles. These catheters, usually of 12 or 14 F size, were not efficient drainage-tubes.

Possibly, with continuous gentle suction they might have proved satisfactory; without this they quickly became blocked with fibrinous clots. Unless continuous suction is available, a tube of much wider bore is required. As a routine the catheter was removed except in those rare cases where there was drainage, and we relied on intermittent aspiration of the chest with a syringe. On one occasion removal of the catheter was followed by the rapid escape of 17 oz. of serosanguinous fluid which had been dammed back.

Pneumothoraces were released by using an intercostal needle attached to a water-sealed drainage bottle. No attempt was made to aspirate air; it was considered adequate if the intrapleural air-pressure was reduced to atmospheric pressure. Whenever possible radiological control was used; but for technical reasons it was impossible to use the X-ray apparatus while we were at sea, and it was necessary to depend largely upon clinical findings for deciding when to aspirate. This was, of course, not satisfactory; for, while almost all the patients showed some improvement judging by their increased comfort, loss of apprehension, and increased exercise tolerance, the clearance of the pleural cavities was delayed and a greater number of thoracotomies would probably be required at a later date.

The common emergency was tension pneumothorax.

Sudden development of this in a patient who had been comfortable with no cyanosis or dyspnœa on slight exertion was very alarming. It was found that a readily available water-seal drainage apparatus was an M.R.C. giving set connected to the air-inlet tube of an M.R.C. bottle. In one patient who suddenly developed acute dyspnœa, a needle connected to this device was put into the lower part of the chest, and 3 pints of blood were literally pushed out in twenty minutes by the tension of the air above the hæmothorax. Oxygen was tried in many cases of thoracic injury but it was found that the only patients who really appreciated it were these chest emergencies, who clutched the B.L.B. mask as though it was a lifebelt.

Of the 2 patients who died, 1 had a left hæmopneumothorax with collapse of the lung. This had been aspirated but the lung had not yet re-expanded. He suddenly developed a tension pneumothorax on the opposite side, and despite early release of this died of asphyxia. The other case was of bilateral hæmopneumothorax with a valvular opening on the anterior chest wall. In addition, this patient had severe jaundice, probably of infective origin. His hæmothorax persisted despite drainage, aspiration, and vitamin-K therapy.

ABDOMINAL INJURIES

Of the 40 patients with abdominal injuries, 3 died. All were in the postoperative stage, apart from 1, on whom a colostomy was done for rectal damage which, reasonably enough, had been overlooked.

As in the other groups of cases, there were many about which there was little or no information. It was found, however, that this was only a theoretical disadvantage, and that clinically the cases could be divided into two principal groups: those in which bowel sounds could be heard, and those with a silent abdomen. If there was any doubt the case was put in the second category; for, early in this series, the doubtful patients were given a trial period on a limited fluid intake by

mouth, and a few showed fairly serious deterioration. Because of pressure of other work, it was not possible to observe closely these doubtful cases, and it seemed safer to treat them as being worse than they possibly were.

It was assumed that patients with silent abdomens had a true paralytic ileus following peritoneal contamination or infection, and not a postoperative or traumatic ileus. Routine treatment with gastric suction and intravenous fluids was given. A Levine's tube was preferred to Ryle's because of its slightly bigger bore: the Miller-Abbott tube was not used, since a paralytic condition was being dealt with. At first, intermittent aspiration with a syringe was carried out. Later, continuous suction using the two-bottle siphon method was applied, and this proved much more satisfactory and efficient. It was difficult to keep a check on blood-chemistry, but a theoretical fluid and chloride balance was worked out daily for each patient; and during the short time they were with us, this was apparently satisfactory. It is unfortunate that intravenous glucose, which can be given almost ad lib., is so much more likely to irritate the wall of a vein than is normal saline, which has to be rationed.

All the patients in this group were given routine penicillin and streptomycin with large doses of vitamin C. In the absence of definite information about dates of operation, it is difficult to make a statement about the healing of wounds, but my impression is that this was delayed. Of 14 colostomies which were opened, it was thought advisable to use a Paul's tube in 3, for it appeared that sealing-off of the peritoneal cavity had hardly begun by the third or fourth postoperative day. In another 3 cases large abscesses containing upwards of 4 oz. of thick pus were opened through the laparotomy wound. Since these discharged satisfactorily they were not explored, but they appeared to originate intraperitoneally. A feature of them all was that they were almost asymptomatic, and they were obvious chiefly because of their size; it seems likely that the antibiotic therapy had something to do with this.

About 12 cases in this group had damage to one kidney, and in all but 2 the injured kidney had been removed. All those on which a blood-urea estimation was done showed a level of over 100 mg. per 100 ml.; and urine output was not satisfactory, though this could have been related to an inadequate postoperative intake. They were given a controlled, gradually increasing fluid intake with a glucose basis, and they all did well.

Of the cases in which the damaged kidney was not removed, 1 was admitted with a blood-urea level of 180 mg. per 100 ml., and the level rose to 250 mg. per 100 ml. in the next two days, after which the patient died. Intravenous glucose and isotonic sodium sulphate were both administered, but they did not influence his condition in any way.

The other case in which nephrectomy had not been done had, on admission, oliguria with a blood-urea level of 150 mg. per 100 ml. Intravenous glucose produced no response, but there was a temporary increase in urine output after administration of 1 pint of sodium sulphate. This improvement was not maintained, and anuria gradually supervened.

It seems possible that these were 2 cases of reflex anuria, and that primary nephrectomy might have saved them, but on admission they were too ill to withstand operation.

A few cases of wounds of the bladder and urethra were seen.

HEAD INJURIES

Of the 19 patients with head injury, 2 died. One arrived on board unconscious and died without regaining consciousness; no notes were available, but it seems likely that he had severe damage to his basal ganglia. The other had a compound fracture of the skull which had been operated on; it is thought that he had a septic encephalitis. The other cases were of compound fractures of the skull, which had been operated on; and these did well on restricted fluids (2 pints daily) and fairly continuous sedation with intramuscular paraldehyde or sodium phenobarbitone. Routine penicillin and one of the sulphonamides were given.

BURNS

Of 19 cases of severe burns, 2 died. The majority were petrol burns, and most of them had resulted from using petrol to light fires. The value of protective clothing was obvious, and the inflammability of the mechanic's working-dress was demonstrated only too clearly. Treatment consisted in gentle cleaning with cetrimide ('Cetavlon') and saline, followed by dusting with penicillin-sulphonamide powder and dressing with soft-paraffin gauze, padding, and a pressure bandage.

With extensive burns, even when it appeared that a satisfactory pressure-dressing had been achieved, the amount of leakage through the dressings was surprising and almost alarming; and blood, plasma, and electrolytes had to be infused fairly quickly. Frequent blood checks were required. In the 2 fatal cases the necessary fluids were probably not given fast enough. It would seem that there is still a place for coagulation therapy on extensive flat surfaces in an attempt to cut down fluid-loss.

INTRAVENOUS THERAPY

A good deal of practical experience in intravenous therapy was obtained, though control by blood-chemistry observations was less exact than was desirable.

The equipment used was the standard M.R.C. apparatus; but reserves had to be obtained from American sources, and it was found that the different parts of the two types of sets are not readily interchangeable. It seemed that the M.R.C. equipment was easier to supervise, though this may have been only because of familiarity, and all fluids of American origin were transferred to M.R.C. bottles. This was usually done in the laboratory; but, occasionally, when an emergency arose, it had to be done in the ward. No complication followed this potentially dangerous manœuvre.

Blood.—Fresh blood was taken from the ship's company as required, but supplies were also obtained from an American blood-bank. For some reason which was never discovered, this stored blood did not run easily through the M.R.C. apparatus, although there was no difficulty with fresh blood. Eventually, as a routine, each pint of stored blood was diluted with a similar quantity of saline, and the resulting mixture gave no trouble.

Plasma.—Although dried plasma is supposed to keep indefinitely, the available stocks which were of 1942 and 1944 vintage were, for the most part, unfit for use. This may have been due to ineffective sealing of the bottles; but it is perhaps worth mentioning that dried plasma obtained from American sources was marked with a date of expiry.

Technique.—A supply of small bottles containing 10 ml. of sterile isotonic sodium citrate was kept in each ward, and this fluid was used to clear intravenous drips which were not running satisfactorily. It is true that small clots may be set free by injecting the citrate under pressure into the giving set; but there was no evidence that this actually happened, and no complication resulted. When the number of available veins is getting small, every means of maintaining the patency of a vein has to be used. Finally, it is most desirable to avoid inserting an intravenous needle near a joint. The patient should be free to move, within limits, the limb that is being used for an intravenous drip, more especially if for any reason he is not fully cooperative. Effective splinting of the limb was found to be difficult to secure, and it rather tended to obstruct the free flow of fluid. The most easily accessible veins are those on the forearm; but, if these were not available, we cut down on the internal saphenous vein near the ankle. If one of the veins in the antecubital fossa had to be used, a plaster-of-paris splint was applied in preference to a prefabricated splint.

Public Health

PERSONAL HYGIENE AND THE SPREAD OF DISEASE

I. H. J. BOURNE
M.B. Lond.
GENERAL PRACTITIONER, HORNCHURCH, ESSEX

IT has often been suggested that the virus of poliomyelitis may be transmitted by fæces; certainly they are the source of infection in some other diseases, notably gastro-enteritis. My aim here is to show that such infections, and possibly poliomyelitis too, can be spread as a result of faulty personal hygiene in lavatories.

Poliomyelitis virus has been found in the fæces of healthy adults in five out of six households where a case occurs (Pearson and Rendtorff 1945). Burnet (1940) points out that the high incidence of infection in infants is always associated with an abundant source of virus in the environment, excreted in the fæces by adults and older children.

THE MODE OF TRANSMISSION

If lavatory fitments could be incriminated as factors in transmitting the virus from person to person, light might be thrown on the mystery of epidemic spread of poliomyelitis, as well as on the transmission of gastro-intestinal infections.

The crimes of serving and eating food, and washing-up, with unwashed hands are so common, and so hard to combat in large communities, that they come to be tolerated even by those who have fought to eliminate them. Printed injunctions, supply of washing facilities, personal supervision by a responsible officer—all these wax and wane because of human frailty. The battle is still being waged by our public hygienists, and is foremost in all pamphlets advising on the prevention of disease.

There is a general aversion to such unhygienic activities as sharing eating utensils, towels, and shaving-mugs. Moreover, the man-in-the-street in most countries is increasingly aware that epidemic disease may spread via contaminated hands, food, water, or milk. All the more surprising, therefore, is the world-wide existence of a "blind-spot" in the toleration of modern lavatory routine.

SOME CURRENT PRACTICES

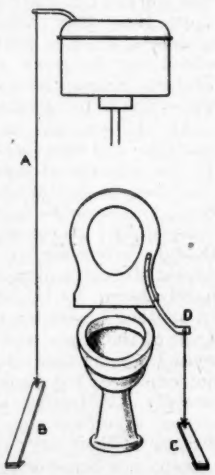
Ideally, a person entering any lavatory should find a wash-basin, soap, and clean towel provided, in addition to equipment which is often disinfected, and a clean seat-towel. Hygienic toilet-paper should also be provided. In many conveniences in offices, restaurants, and shops neither paper nor washing facilities are supplied. Even in public lavatories supplied by local health authorities a charge is made for the use of washing facilities—if they are provided at all. In the home, even the best of small children do not wash carefully unless supervised. It is worth considering the conditions in some primary schools. Within ten minutes of school opening the closets are turned into a hygienist's nightmare. The seats, chains, and handles become soiled with excreta. Any infective organism could be transferred from these places to the hands of other users of the same closet. The time elapsing between visits would be very short, especially in the rush-hours of morning break and lunch-time. In summer the germ might not cool sufficiently to be destroyed: it could remain viable for some time.

FOOT-CONTROL OF CLOSET APPARATUS

Even in a perfectly equipped lavatory it is possible for a user to leave with germ-contaminated hands, in spite of conscientious washing. An infected person may touch not only the articles mentioned; he may deposit infected material on the door-handle, door-lock, door-surface, the hand-taps, the soap-container, the paper-box. Thus it is easy to feel a false sense of security.

Malten (1946) has described a foot-operated flushing system. A simple foot-lever is fastened to the floor and the chain lengthened to meet it. Dr. Malten points out that many people use the chain rather than the handle. He therefore encloses the adaptor chain in a metal gas-pipe fastened to the wall. Incidentally he refers to the increase of threadworm infection during the "soapless war years."

Foot-control being an advance, it is reasonable to apply it to water-tap manipulation, to the raising or lowering of the lavatory seat, and to door control. Many hospitals are fitted with foot-operated wash-basins. In future such fitments should be made compulsory in lavatories. The door could be closed after entry and fastened by an automatic spring catch at floor level; by means of a foot-release mechanism it could also be made to swing open automatically, and remain ajar. This would allow the occupant to leave without handling the door. It is noteworthy that in New York doors are not considered necessary in some public lavatories.



The hand-chain is replaced by a long chain (A), which connects the cistern lever to one end of a wooden pedal (B). The other end of the pedal is hinged to the floor. The lavatory seat is shown in the raised position. This is achieved by stepping on the wooden pedal (C), which is attached by a short chain to a lever (D) made of 5-ply wood.

There are several practical advantages in foot-control. First it conforms to generally accepted principles of hygiene and æsthetics. Then the cistern lever is less liable to strain and damage, because the foot-pedal descent is checked by the floor. Sanitary engineers might well devise new models in which the only visible parts need be foot-buttons projecting through the floor to operate the cistern and the seat. Existing systems can be adapted immediately by a handy-man equipped with wood, screws, hinges, and a length of chain, as shown in the illustration. By this device children are spared the problem of how to reach the chain, and adults are spared the consequences of some of the solutions they commonly find for this problem.

Even if it be generally conceded that such a reform is desirable, the changeover to foot-operated closets is likely to be gradual. Meanwhile some other devices should help us to attain a measure of safety. Paper can be used to cover and handle the seat, and paper towels for individual use can be obtained. A bowl of chlorinated water would be an asset as a hand-steriliser in closets and kitchens. Sellers of soft fruit should use scoops where possible, and cooks should use ladles and servers.

I wish to thank Dr. Charles Wilcocks, Dr. J. Gorman, and Dr. P. X. O'Dwyer for their help and advice, and Mr. D. Chaffey for help with the illustration.

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Influenza

In the great towns of England and Wales deaths from influenza increased from 458 in the week ended Jan. 6 to 890 in the week ended Jan. 13—the largest increment in the last twenty years. Pneumonia cases and deaths, and influenza deaths, in the great towns during the seven weeks up to Jan. 13 were as follows :

	Week ended						
	Dec. 2	*Dec. 9*	*Dec. 16*	*Dec. 23*	*Dec. 30*	*Jan. 6*	*Jan. 13*
Pneumonia :							
Cases	282	347	374	364	502	956	1300
Deaths ..	198	236	289	351	383	770	982
Influenza deaths..	28	34	33	54	102	458	890

Totals for the great towns during the first two weeks of this year, compared with the corresponding period in the preceding two years, are as follows :

	1949	*1950*	*1951*
Pneumonia :			
Cases	1237	1189	2256
Deaths	799	599	1752
Influenza deaths	87	99	1348

For the whole of England and Wales notifications of primary and influenzal pneumonia in the seven weeks up to Jan. 13 were: 497, 573, 684, 647, 962, 1774, and 2538.

The bulk of the increase in influenza deaths has occurred in the Northern and North-Western regions, as is shown by the following summary of the incidence of deaths from influenza per million population in the great towns grouped regionally :

Region	*Week ended* *Jan. 6*	*Jan. 13*
Northern	83	91
North-Western	63	138
London and South-Eastern	11	21
Others (average)	5	13

Of the 890 deaths from influenza in the great towns during the week ended Jan. 13, 85% were of patients over 55 years of age. The total for each age-group is as follows : under *1* year, 12 ; *1–15*, 4 ; *15–25*, 3 ; *25–35*, 7 ; *35–45*, 33 ; *45–55*, 75 ; *55–65*, 156 ; *65–75*, 277 ; *75* and over, 323.

Pneumonia cases and deaths notified in the great towns have increased proportionately much less than influenza deaths. Deaths from pneumonia and influenza have been relatively very numerous in the great towns in the more northerly regions, and especially in Liverpool. In the week ended Jan. 13 Liverpool suffered more than any of the other great towns : of 949 deaths in the city during this week, 216 were attributed to influenza and 214 to pneumonia. (Prof. W. M. Frazer, the medical officer of health, is reported [1] to have said that an average weekly figure for deaths in the city at this time of year was 200.)

Though the incidence of influenza is increasing throughout the country, it seems that no situation has developed elsewhere comparable to that in the North and North-West ; in London and the rest of the country the disease is comparatively mild, with some more intense localised outbreaks.

Claims to Sickness Benefit.—In England and Wales new claims to sickness benefit under the National Insurance Act numbered 370,500 in the week ended Jan. 9, compared with 233,400 in the week ended Jan. 2.[2] For the guidance of people claiming sickness benefit whom the doctor cannot see without some delay, the Ministry of National Insurance has issued advice in the following terms :

" To avoid loss of benefit, a person who is prevented by illness from working should give the local National Insurance Office written notice of incapacity within the first three days. This notice is normally given on the First Medical Certificate (MED. 1) issued by the doctor when he first attends the patient ; but where exceptionally the patient has not been seen by the doctor within the first three days, a note written by or on behalf of the patient is accepted as notice. Where notice has been given without a medical certificate, the formal claim on the doctor's First Medical Certificate should follow as soon as the doctor has been seen, and in any case within ten days of the start of the illness." Patients who have to give notice without a medical certificate should give their full name and address and their National Insurance number. If they are claiming an increase of benefit for wife or other dependant, details should be given. If the doctor's examination has been delayed and he wishes his certificate to cover any earlier period of incapacity, he can give a supplementary certificate (MED. 5) or he can make a suitable note in the " remarks " space on the first medical certificate.

Influenza Abroad.—The situation in Europe was reviewed last week (p. 168). Influenza is now prevalent also in Finland, where cases have been shown to be due to the A-prime strain. In Spain, as in Holland, there is evidence that the disease is due to virus A.

Last week W.H.O. issued the following comment :

" The fact that in 1949 influenza was more prevalent in European countries other than Scandinavia and Britain leads one to think that the contrary will happen this year, and that regions so far spared this winter will remain less seriously affected. Latest information indicates a decrease in the number of cases observed in Copenhagen and Oslo. Research . . . indicates that the virus causing the current outbreak belongs to type 'A.' . . . Neither the spread nor the severity of the influenza epidemic now prevalent can be compared with the more serious epidemics which occurred in the first part of the century. So far, complications are rare and the mortality rate remains very low. . . . Influenza is now present not only in Europe. The World Health Organization has also been notified of outbreaks in Hawaii and Japan, while the disease has made its appearance in Canada and the United States as well."

Smallpox at Brighton

Up to noon on Jan. 22 there had been no notifications of smallpox outside the Brighton area. The total number of cases notified (uncorrected) is 30, and there have been 9 deaths. With 2 exceptions the recent cases have been in contacts under surveillance. In view of the occurrence of a suspected case at Crowborough, Sussex, it would be premature to state that all the sources of infection in Brighton are known or that the end of the outbreak can be foreseen. The need for special vigilance continues throughout the country.

Poliomyelitis

In England and Wales notifications of poliomyelitis during the week ended Jan. 13 were : paralytic 27 (37), and non-paralytic 11 (10) ; total 38 (47). These figures represent a decrease in notifications of 9 compared with the previous week, for which the figures are given in parentheses.

Notifications in the corresponding week of the previous four years were : 1947, 16 ; 1948, 49 ; 1949, 37 ; and 1950, 50. The notifications in the second week of 1951—38—are therefore well below those for the corresponding week in 1948 and 1950. These three years are comparable in that they followed years of very high prevalence.

Births and Deaths in 1950

In England and Wales the provisional stillbirth-rate and infant-mortality rate for 1950 were the lowest ever recorded. The Registrar-General reports [1] that the stillbirth-rate was 22·6 per 1000 total births and the infant-mortality rate 29·8 per 1000 live births, compared with 22·7 and 32·4 in 1949. The birth-rate was 15·8 per 1000 population, compared with 16·7 in 1949 ; and the death-rate was 11·6 per 1000 population, compared with 11·7 in 1949.

1. *Times*, Jan. 17.
2. Figures supplied by the Ministry of National Insurance. See Registrar-General's Return for the week ended Jan. 13, p. 18.

1. The Registrar-General's Weekly Return for the week ended Jan. 13. H.M. Stationery Office. Pp. 20. 6*d*.

In England Now

A Running Commentary by Peripatetic Correspondents

IN our first house-jobs we owe a great deal to the tactful guidance of that fine body of women, the ward sisters. I have never ceased to wonder at the apparently implicit faith with which, later on, they gracefully accept our instructions. But in recent years they have fought and lost the battle for beef-tea against its commercial substitutes. "Is he eating?" I used to ask, and sister would reply, "Yes, Doctor, I'm very pleased with him today; he took a little beef-tea." Years of facial grimaces and firm remonstrance have been needed to convince them that the goodness of the meat is not in the brew but in the dustbin.

Now, when we doctors have almost won this battle, I am faced as a pædiatrician with a new engagement. It concerns the latest method of dealing with premature infants. I can feel the almost personal animosity aroused by my sadistic action. Can there be a more cruel and heartless beast than I, who would starve a newborn baby—a baby weighing only 2½ lb. For years the first flavour that such babies tasted has been the gentle warmth of Cognac brandy. "And now," I can hear one sister saying to another over their private cup of tea, "these so-called specialists, who a few years back couldn't tell a nappie from a kaolin poultice, give us orders that not even diluted milk must pass their lips for two, three, or sometimes four days." It will be a long battle this time, calling for eternal vigilance, even in the early hours of the morning, with every probationer, every student nurse, a potential enemy.

* * *

Now that attention has been called to Mr. S. Potter's omission of doctors from his great works, *Gamesmanship* and *Lifemanship*, I shall certainly be swamped with requests for some account of my own painstaking (and -giving) investigations on Doctorship, Patientship, and Nursewomanship. Though my results are not yet codified, I am therefore publishing these preliminary notes.

1. *Doctorship* is defined as getting one up on the patient without actually killing him. One need not say much more in a medical journal, since any doctor who has survived even a fortnight in general practice must have acquired a detailed knowledge of the more important ploys.

2. *Patientship* is getting one up on the doctor without actually invoking the General Medical Council or committing suicide. In its highest form this often passes unrecognised until the surgery door is closing and the doctor senses that he is not entirely master of the situation. Only then will it dawn on him that he has been the subject of a Patientship Ploy—too late for any effective counter-ploy. An example of this technique is the Name Ploy. Many doctors, in the interests of dignity, adopt a double-barrelled name. An elementary patientship ploy is to ignore the first part and address the doctor by the second, and often more vulgar, name—thus Dr. Fotheringay-Smith and Mr. Beauchamp-Jones become simply "Dr. Smith" and "Mr. Jones." This ploy is effective only against general practitioners and newly established consultants. The experienced consultant will retort with the equally simple counter-ploy of expressing gratification at the single name as a sign that his fame is now so great that identification by the first name is no longer needed. A variation on this ploy, suitable only for the most senior Patientmen, is mispronunciation of the doctor's name. This works best if the name is unusually flamboyant. On one occasion my friend Hopking was greeted on his admission to hospital by the genito-urinary surgeon, a Mr. Leigh-Kerr, with: "Ah! Good morning, Hopkins." He replied "Hop*king*, please, Mr. Leaker," and the next day was given the only single-bedded ward in the hospital.

Fildes-Priestley based the gambit since known by his name on the hypothesis that nothing rattles a doctor worse than a hint that he is ailing. Certainly few doctors could withstand Fildes-Priestley's own hearty greeting of: "Hello, Doc, you *are* looking tired these days." Another approach, favoured by J. Grenfell, is to interrupt the doctor's history-taking with: "And how's the doctor himself? Nobody asks after *his* health." The most advanced Patientmen sometimes embroider this ploy with technical terms, but these are apt to rebound if not absolutely fresh. My distinguished friend, J. Hopking, usually scored heavily by stepping up to his doctor, examining his conjunctivæ, and remarking: "Hm, ha. A little anæmic, I see, Doctor." But on one occasion he was met by the counter-ploy of: "Yes, I was badly let down by that fallacy in my student days. Nowadays students learn in their first term that only hæmoglobinometer readings can be relied on. On the Sahli scale my Hb is 105%." Because of this danger D. Sharp prefers the simpler ploy of addressing his doctor as "Sir," in tones implying reverence for advanced years rather than respect for professional attainments.

3. *Nursewomanship* is defined as getting one up on the doctor and/or the patient (but preferably both) without actually marrying either. An additional and important aspect of Nursewomanship consists, of course, in the Anti-Sister and Contra-Matron Gambits.

The leading exponent of Nursewomanship in the London region tells me that her basic ploy is to confess frankly, in full detail and at great length, to doctor, patient, and sister alike, every mistake she makes (except of course the fatal ones). In this way she attains a position where she can lead, so to speak, from strength.

* * *

What doctor is not a good driver, and what doctor has not had a motor-car accident? After a late Sunday morning round I sipped coffee with the theatre staff, vowed I was going away till next year, and went out to my car in the snow. I had intended to walk to the hospital that morning, for the snow was deep and the roads treacherous; but a farewell remark of my wife's that she supposed I'd be as late home as usual had made me quietly change my mind. Now, eager to spring a surprise, I left for home.

The drive, as it twists and turns through the hospital grounds, passes through a narrow one-way defile, carefully protected by two blind corners. I had passed the worst part and was moving on to the open road beyond when I espied our elegant medical registrar, preoccupied and even later than I, heading for the hospital as fast as his A40 would go. Fascinated, I just had time to remark to myself, "If he's not careful there will be trouble," when I realised I was in the direct line of the trouble. Tooting valiantly and drawing in to the side, I then sat spellbound as he applied his brakes on the ice and catapulted with a crash against the door of my car.

We both alighted, both smiled sickly smiles, and both realised that our car was out of action for at least three weeks, that our no-claim bonuses had gone-with-the-wind, and that we would both be late home for lunch.

Returning sheepishly from telephoning our respective wives, we found the impacted cars surrounded by a team of gleeful surgical registrars who, having critically examined and photographed the remains, advanced some colourful theories on the cause of the disaster. Finally, turning their energies to good account, they disimpacted the cars, pushed them to safety, and declared the accident an excellent excuse for a further party.

Trudging home later, I reflected that Sunday should indeed be a day of rest, that our medical registrar was really too conscientious for a physician, and that the time had come for me to apply to the Regional Board for *danger money*, if only to offset the projected cuts in car allowances and the "loading" for specially risky occupations which any insurance company would hereafter add to my premiums.

* * *

Could you alter my little girl's certificate, please, doctor? The club man called today and said if she'd broken her arm she'd have got 10*s*. a week, but as she's fractured it she'll only get 5*s*.

* * *

Aphorism of the Week

Tonight's mystery may be solved by tomorrow's otorrhœa.

Letters to the Editor

PROSPECT OF WAR

SIR,—There must be thousands of doctors who would like to join with Professor Penrose and his colleagues (Jan. 20) to press, as doctors, for the healing of the world-wide disease of war, if they could but see their way. But, like so many of our fellow-citizens, we are afraid of being "misled by quasi-communism" (*Manchester Guardian*, Jan. 19) or playing some other enemy's game if we so much as toy with the idea of negotiation from equality instead of striving after what may well be a receding illusion of "negotiation from strength."

Our political leaders dissect recent history as if it gave us the clue to everything. Even so the Power that negotiated from strength at Munich lost the subsequent war, following the historical pattern that it is usually the stronger Power that attacks—and gets beaten (Quincy Wright: *Study of War*). It is ingenuous too to assume that, because appeasement at Munich failed to prevent war, the reverse must either have succeeded then or be the golden rule for all the future. There are many ways of going to the devil; and among nations challenge and armament must have proved at least as reliable routes as appeasement has ever done. *Facilis descensus averno.*

The attitudes of peace are positive attitudes. Doctors need not become politicians to proclaim to the world that it is their habit to treat foreigners as human beings. Whatever their ideology the dose is the same. We can go on and attempt to recall politicians and journalists from their frenzies of hatred to the solid need of all men everywhere to be treated as equals, or at least as similars, whether they are misled by Communists, led by Socialists, or guided by capitalists. And, like sick men, the sick nations of the world need peace and quiet, an end of past irritations, and a period, not of feverish activity, but of absolute rest for inflamed parts.

Finally, could not some international medical or medicolegal congress meet and commend to governments the need for, and the conditions of, a peaceful regulation of our lives? It seems an infinite pity that the conditions of world-wide law and order are known to international lawyers today and yet can still be so deliberately flouted by every sovereign State as such.

Edinburgh. RANYARD WEST.

SIR,—Much as I sympathise with all appeals for reason and peace, I am bound to say that last week's appeal by seven doctors to their fellow-doctors in this country to do "all in their power to halt preparation for war and to bring about a new and determined approach to the peaceful settlement of disputes and to world disarmament" seems to be wrongly addressed.

These seven doctors are opposed to the policy of the Government and the Opposition in preparing for the defence of democracy against the onslaught of totalitarianism. They are certainly entitled to their views, and they have (and should have) every right to express them. But when they explain to British doctors that "willingness to coöperate and to understand the other man's rights and needs are hallmarks of civilisation" they are stating only a truism, as long as they are not able to produce evidence that Czechoslovak (or Hungarian or Polish) doctors are likewise free to express the same opinions and to oppose the governments of their country in the same way. Willingness to coöperate and to understand the other man's rights and needs *are* the hallmarks of civilisation; but precisely because doctors in Czechoslovakia and other countries are forbidden to show any willingness to coöperate, and because they are denied any chance to understand the other man's rights and needs, the world is once more at the cross-roads. The danger of war is—as it was just over a decade ago—the consequence of dictatorship and not of the belated willingness of the democracies to defend themselves and the right to understand the other man's rights and needs. "Cet animal est bien méchant! Quand on l'attaque, il se défend."

BOHEMICUS.

SIR,—For some time I, and many of my young colleagues, have been oppressed by an overwhelming sense of shame and disgust at the apparently defeatist attitude of the medical profession towards the senseless drift to a Third World War. We have waited impatiently for responsible medical men to raise their voices in protest, and until last week we had waited in vain. Our wait was not altogether passive and we have attempted often to give a lead albeit unsuccessfully.

The signatories to the letter "Prospect of War" have to some extent relieved this sense of oppression and shame. May I say, therefore, that I wish to associate myself wholeheartedly with the sentiments they have expressed and their appeal to fellow doctors.

London, N.W.6. JOHN Z. GARSON.

SIR,—It is becoming increasingly obvious that politics and medicine together are undergoing a shift to the left. An already incongruous commensalism is being changed into a more virulent parasitism. Presumably in the end politics only will be remaining.

It was all the more alarming to see the rate of this change so exposed in your last issue, when political propaganda was allowed to invade the columns which have hitherto been spared for medicine, under the title "Prospect of War."

If such political missionaries "feel compelled to express themselves publicly" again may I, Sir, suggest it be in a special supplement, in limited edition, distributed only to those who express a wish for it?

Woking. D. W. S. SHELDON.

SIR,—As one of the many liable to early recall to the Forces should hostilities break out again, I should like to express my appreciation of the comments on this subject by Professor Penrose and his colleagues. It seems to me that some recognition of the dangerous international situation is no more out of place in a medical journal than it is in any other publication, the more so as doctors would be expected to play a greater part than ever before in any future war. On the contrary, such references merely reflect the growing concern of all sections of public opinion over the present catastrophic drift to war.

It is not my intention, however, to try to turn your columns into a political forum. Rather would I content myself with applauding the increasing preoccupation of men of science with world affairs and hoping that they may thereby recognise their own responsibility in this respect. Such interest in the past might have gone a long way to averting previous disasters.

As yet, however, there is no organised movement in this country to make known the views of responsible scientific workers, medical or otherwise, on this matter, so vital to us all. The United States, however, is a jump ahead of us, for in 1949 a group of American scientists formed a Society for Social Responsibility in Science, one of whose main objects is to resist the increasing military and political encroachment on human knowledge and scientific research. This body includes many eminent men of science, doctors among them, in its membership roll, and I consider that we could with profit follow its lead, if only to show that all eminent scientists in this country are not Communists or fellow-travellers. It takes greater courage to form such a progressive movement in present-day America than it would here in Britain, but as yet we have had no lead from our own eminent men of science. As of all professions Medicine should stand

for Wisdom and Peace. I am hoping that Professor Penrose and his colleagues may provide this lead.

London, N.4. ADAIR GIRBY.

SALICYLATE, GENTISATE, AND CIRCULATING EOSINOPHILS

SIR,—The letters from Dr. Kelemen and his colleagues [1] and Dr. Bertolani and his colleagues [2] prompt us to report some of our results. These workers found that the administration of salicylate and gentisate in animals, and of salicylate in man,[1] was followed by a marked reduction in the number of circulating eosinophils. This latter phenomenon has been used as an indication of adrenal cortical activity, and is of great interest because of the suggestion that the activity of salicylates may be related to stimulation of the adrenal cortex causing a liberation of corticoid substances which relieve rheumatic manifestations,[3] and also because of the report of a mild Cushing's syndrome produced by aspirin.[4]

We have investigated the effect of oral administration of sodium salicylate and sodium gentisate on the number of circulating eosinophils in eight normal healthy subjects after establishing the functional integrity of the pituitary/adrenal cortex system by means of ephedrine.[5] No significant depression in the number of circulating eosinophils was observed with plasma-salicylate concentrations of up to 30 mg. per 100 ml. and plasma-gentisate levels of up to 25·5 mg. per 100 ml. Kelemen (personal communication) states that plasma-salicylate concentrations of over 30 mg. per 100 ml. were necessary to produce such an effect, and the work is being continued to include investigation of higher plasma-salicylate and plasma-gentisate concentrations.

Department of Chemical Pathology, King's College Hospital, London. B. W. MEADE
M. J. H. SMITH.

VACCINATION AGAINST SMALLPOX

SIR,—However mistaken Dr. Killick Millard's views and however pernicious the effect on the public mind when garbled versions of his article are reported in the public press, you are to be congratulated on your wisdom in publishing the article. It is a comforting sign that we have not yet reached the state of totalitarian countries which only permit the dissemination of orthodox views on scientific matters. The editor's liberal attitude does, however, make it even more necessary that an authoritative statement of the case against Dr. Millard's curious reasoning should be published, and I hope this will be forthcoming.

Dr. Millard's article (Jan. 13) is so full of non-sequiturs that a considered reply would necessarily far exceed the limits of a letter, but some passing reflections may be made; his attitude reminds me of old Father William, who persisted in standing on his head. Dr. Millard's central argument is that while vaccination undoubtedly protects the individual it is detrimental to the community. If, on the other hand, he had said that whereas one cannot guarantee that vaccination will protect every individual there is no doubt that a well-vaccinated community is protected against smallpox, he would have carried informed opinion with him. It is well known that a small proportion of individual men and animals do not respond to vaccination or immunisation by developing immunity and that they may succumb to subsequent infection although the immunised herd as a whole will have acquired adequate protection.

Carried to its logical conclusion, Dr. Millard's argument could be used to discredit inoculation against diphtheria since it is well known that immunised insusceptible children can act as healthy carriers of the infection and so infect unimmunised susceptible children. Does Dr. Millard therefore suggest that the strikingly successful campaign against diphtheria should be dropped or that all children should be immunised?

Incidentally, Dr. Millard himself says "I am all in favour of everyone who visits the East being efficiently protected by recent vaccination." It is surely relevant that both last year's Glasgow outbreak and the current episode at Brighton were initiated by this type of person. Does Dr. Millard then suggest that contacts of these people should not be vaccinated? Or perhaps he would advocate that any such people who insist on returning to this country should be kept in quarantine for at least a fortnight because of the unvaccinated state of the population here?

South Mimms, Barnet, Herts. DOUGLAS MCCLEAN.

ADJUVANTS TO STREPTOMYCIN

SIR,—In his paper of Dec. 16 on tuberculous meningitis, Dr. Cathie cites a report by Dr. Kirmse and me regarding the treatment of tuberculous meningitis with streptomycin and 'Promizole.'[1] He states that we reported that "13 out of 18 cases appeared to be doing well 3–6 months after treatment had started" and expresses interest in a later report of these cases.

In our report table III showed that 8 patients had already survived for 12–21 months, and the remaining 5 for 7, 7, 6, 5, and 3 months. Up till now (Jan. 4) there has been 1 further death during a relapse of meningitis, leaving 12 survivors of the original 18 cases with a survival range of 45 to 27 months.

Department of Pediatrics, New York University—Bellevue Medical Center. EDITH M. LINCOLN.

EXTRAPERITONEAL CÆSAREAN SECTION

SIR,—I read with considerable interest the article of Jan. 13 by Mr. Stansfield and Mr. Drabble.

Since 1946 I have done an extraperitoneal cæsarean section in 15 cases; but I find that I am doing gradually fewer each year. It is an appealing operation, because of the technical artistry required; but one must not be distracted by this lure. With the present array of antibiotics to combat the spread of infection to the peritoneal cavity, the success of the transperitoneal lower-segment operation can be assured, and the premier advantage of the extraperitoneal operation has disappeared.

In my experience, there is only one type of case where the extraperitoneal operation is required: that is where cæsarean section is necessary on obstetrical grounds with the additional complication of a protracted labour with the concomitant severe distension of the gut, and the patient is in poor general condition. These cases do extremely well under local anæsthesia, and even the risk of spinal anæsthesia can be avoided. The greatly distended gut is under the control of the peritoneum, thus avoiding any difficulty when the wound has to be closed. The convalescence is also easier and there is, as Mr. Stansfield and Mr. Drabble state, less postoperative ileus. With incipient shock the tissues can be handled gently and there is no worry about adding to the shock by either general or spinal anæsthesia.

I am sorry that the article does not mention the simplest way of doing this operation, and the one which is certainly the easiest to learn—namely, the method introduced by Cacciarelli.[2] In this operation a small button-hole is made in the peritoneum above the bladder, and, with the finger through this, the vesical peritoneum is dissected off. Thereupon, the small opening is closed with a purse-string suture, so that the peritoneum is then a closed cavity, before opening the lower segment.

1. Kelemen, E., Majoros, M., Tanos, B. *Lancet*, 1950, ii, 457.
2. Bertolani, F., Lorenzini, R., Bonati, B. *Ibid*, Jan. 6, 1951, p. 54.
3. Calesnick, B., Beutner, R. *Proc. Soc. exp. Biol., N.Y.* 1949, **72**, 632.
4. Cochran, B., Watson, R. D., Reid, J. *Brit. med. J.* 1950, ii, 1411.
5. Abelson, D., Moyes, E. N. *Lancet*, 1950, ii, 50.

1. Lincoln, E. M., Kirmse, T. W. *Lancet*, 1949, i, 767.
2. Cacciarelli, R. *Amer. J. Obstet. Gynec.* 1947, **53**, 100.

I think that Mr. Stansfield and Mr. Drabble are very sweeping in their condemnation of cervical incisions; these, when carried out carefully, can only be of benefit. In the Ayrshire unit, with over 1900 confinements per annum, an average of 3 cases each year have been delivered by this method, without any maternal mortality; and the convalescence after vaginal delivery is still in the main more comfortable than after abdominal operation.

It would appear from the criteria quoted by Mr. Stansfield and Mr. Drabble that many of the complications indicating extraperitoneal section are manufactured by ourselves in our maternity hospitals and could well be treated by transperitoneal section, with the one rare exception I have indicated.

Ayrshire Central Hospital, Irvine. RICHARD DE SOLDENHOFF.

A.C.T.H.

SIR,—In his article last week Dr. Morris says that adrenocorticotropic hormone (A.C.T.H.) is unlikely to be present in normal blood. This opinion is based upon the observation that intravenously administered A.C.T.H. cannot be detected in whole plasma after 20 minutes and that multiple divided doses are more efficacious in therapeutic use.

It is likely that Dr. Morris's review was written before the publication of Bornstein and Trewhella's paper [1] on adrenocorticotropic activity of acid acetone extracts of plasma. I have confirmed this work; such extracts are active in the ascorbic acid depletion test of Sayers, Sayers, and Woodbury.[2]

In my opinion therefore, adrenocorticotropic hormone is normally present in plasma, and the observations referred to above could be interpreted as indicating a rapid turnover rate of the hormone.

Department of Chemical Pathology, King's College Hospital Medical School, London, S.E.5. D. M. V. PARROTT.

SIR,—In Dr. Morris's review, two very important contributions to the chemistry of the formation of the cortical steroids have not been considered. Dr. Morris states that it is likely that secretion of both the "glycogenic" and "mineral" cortical hormones is under the control of the pituitary. In view of the fact that all the so-called "glycogenic" hormones affect sodium metabolism [3] this division appears rather arbitrary and will confuse an already difficult subject.

Pincus et al. [4] have shown that 11-desoxy compounds are oxygenated in the 11 position by perfusion through the surviving adrenal gland. Also Zaffaroni et al. [5] have been able to identify 17-hydroxycorticosterone and corticosterone in the adrenal vein blood of dogs. It is significant, too, that, although desoxycorticosterone has been well known for such a long time, apart from one unsubstantiated claim it has never been found in biological material. This is of the utmost importance for it has been previously shown that the injection of 17-hydroxycorticosterone leads to sodium excretion [3] and the injection of corticosterone to sodium retention [3] although both have considerable "glycogenic" effects.[6]

We thus agree with Dr. Morris that the effect of A.C.T.H. on mineral metabolism will depend upon the relative proportions of steroids the adrenals are stimulated to secrete, but consider that the division into "glycogenic" and "mineral" corticoid hormones is undesirable.

Department of Chemical Pathology, King's College Hospital Medical School, London, S.E.5. J. BORNSTEIN
CHARLES H. GRAY.

1. Bornstein, J., Trewhella, P. *Lancet*, 1950, ii, 678.
2. Sayers, M. A., Sayers, G., Woodbury, L. A. *Endocrinology*, 1948, **42**, 379.
3. Thorn, G. W., Engel, L. L., Lewis, R. A. *Science*, 1941, **94**, 348.
4. Hechter, O., Jacobsen, R. P., Jeanloz, R., Levy, H., Marshall, C. W., Pincus, G., Schenker, V. *J. Amer. chem. Soc.* 1949, **71**, 3261.
5. Reich, H., Nelson, D. H., Zaffaroni, A. *J. biol. Chem.* 1950, **187**, 411.
6. Olson, R. E., Thayer, J. A., Kopp, L. J. *Endocrinology*, 1944, **35**, 464.

RESEARCH IN ANTHROPOMETRY

SIR,—The Medical Research Council have appointed a committee on growth and form, under the chairmanship of Prof. P. B. Medawar, F.R.S,. with the following terms of reference:

"To advise and assist the council (*a*) in promoting research on the growth and form of the human body with particular regard to the provision of basic scientific data, including the elucidation of factors affecting the rate of growth of the whole body and of its parts and the establishment of norms of stature and weight for different ages and different sections of the population; and (*b*) in facilitating the application of such data to various practical problems, including such as arise within the field of clinical medicine."

One of the committee's first tasks is to make a review of work in the field of anthropometry. The committee would accordingly be glad to have information about current or completed anthropometric surveys, including unpublished records, so as to avoid any unnecessary repetition of work and to ensure, if possible, that use is made of existing material. It is believed that there are in existence records of height, weight, and other body measurements which, if analysed, could form the basis for research into growth and development. Serial records of the growth of the same children from year to year, as well as measurements which have been recorded over a long period of time, would be particularly valuable.

Medical School, Hospitals Centre, Birmingham, 15. E. M. B. CLEMENTS
Secretary.

BILE PIGMENTS IN URINE

SIR,—The test for bile pigments in urine described by Mr. Ingham (Jan. 20) is a test for bilirubin only. Much confusion has arisen because of the failure to recognise that there are two main groups of bile pigments occurring in pathological urines—bilirubin and biliverdin on the one hand, and on the other "urobilin" and "urobilinogen," the latter group requiring tests different from those used for the former group. The detection of urobilinogen and urobilin may be of great value not only in the differentiation of the various types of jaundice but also in the assessment of the stage and progress of cases of infective hepatitis.

Department of Chemical Pathology, King's College Hospital Medical School, London, S.E.5. M. J. H. SMITH.

VITAMIN B_{12} IN PERNICIOUS ANÆMIA

SIR,—The view has been expressed from time to time that liver extracts contain factors additional to vitamin B_{12} which are necessary for the well-being of patients with pernicious anæmia.

We have always held that the question whether vitamin B_{12} is an adequate treatment for pernicious anæmia could only be answered after a large number of patients had been satisfactorily maintained for not less than two years. In this hospital we have a number of patients who have been on controlled maintenance treatment for many years, various liver extracts having been used. Since January, 1950, all patients have been treated by vitamin B_{12}, and we believe that the results of maintaining such a group for one year are of interest.

The patients were divided into three groups: (1) 37 received 20 μg., (2) 49 received 40 μg., and (3) 58 received 80 μg. of vitamin B_{12} ('Cytamen') each month by intramuscular injection. Taking a red-cell level of less than 4,000,000 per c.mm. as indication of relapse, none of these patients relapsed. Those receiving 40 μg. each month showed higher average red-cell levels than those receiving 20 μg. each month, and those receiving 80 μg. each month showed a higher red-cell level than those receiving 40 μg. each month. On the 80 μg. dose 98% of the patients showed red-cell levels above 4,500,000 per c.mm., and 70% red-cell levels above 5,000,000 per c.mm.

When the condition of these patients treated with vitamin B_{12} is compared with their previous record under liver therapy, it is found that 3% show slightly lower red-cell levels on vitamin B_{12} than on liver extract, 32% show no significant difference, and 65% are distinctly better on vitamin B_{12} than they were on liver therapy. Thus a majority of our patients are distinctly better when treated with vitamin B_{12} than they were on liver therapy even though, as shown above, more than half the patients are receiving less than an optimal dose of vitamin B_{12}. In the group receiving 80 μg. of B_{12} each month, 80% show a higher red-cell level than they did on liver therapy.

From these observations, therefore, it would appear advisable to give at least 80 μg. of vitamin B_{12} at monthly intervals to maintain a red-cell level of 5,000,000 per c.mm., and it is possible that a larger dose will give still better results. There is no doubt in our minds that these patients have been better in every respect since vitamin B_{12} replaced liver therapy.

Royal Berkshire Hospital, Reading.

J. MILLS
E. H. HEMSTED.

DUAL CAUSE OF RAPID DEATH

SIR,—In his letter of July 15, 1950, Dr. I. B. Morris, pathologist to the Kent and Canterbury Hospital, reports a case of sudden death for which necropsy revealed two possible causes—cerebral hæmorrhage and rupture of the aorta. Cases of this kind are important in medicolegal practice. In 1867 Skrzeczka called the condition "concurrent causes of sudden death"; but this was not quite accurate, and it was Fischer, of Breslau, who in 1923, at the instigation of Professor Puppe, reviewed a number of cases at the Forensic Institute and chose the title "coincidental causes of death." He distinguished three categories: (1) two natural causes; (2) a natural and unnatural cause; and (3) two unnatural causes. The fewest cases, he said, occurred in the first category, and this is supported by my own experience; for I have seen but one case in 10,000 necropsies on adults. (I am not including a case of bilateral rupture of aneurysms of the common iliac arteries with a massive retroperitoneal hæmorrhage. This occurred in a man of 65.)

The case I am about to report is unusual in that there was a hæmopericardium, due to spontaneous rupture of the right ventricle, and a large left-sided lenticulostriate hæmorrhage which had burst into the left lateral ventricle of the brain. According to Huchard,[1] of 259 cases, rupture of the right ventricle occurred in 10·1%, and of the left ventricle in 79·9%. This indicates that spontaneous rupture of the right ventricle is relatively infrequent, which makes my case still more unusual. These percentages accord with those of most authors who have reviewed a number of cases.

A young woman, 32 years old, appeared to be in normal health when he husband went to work early in the morning. Visitors during the morning were unable to get any response, and when the room was forcibly entered by the police she lay dead on the floor near a bed. At necropsy the body was that of a frail woman; there were abrasions about the outer aspect of the right elbow and about the left eyebrow, and a dry brownish stain round the mouth. The scalp and skull were intact. A horizontal section of the brain at the saw line of the skull (Vienna method used at this institution) revealed a large left-sided lenticulostriate hæmorrhage which had burst into the left lateral ventricle; no atheroma of the circle of Willis; no injury to brain; some noticeable coning. The pericardial sac contained 180 ml. of fluid and clotted blood. On the anterior aspect of the right ventricle there was a rupture of the wall 3/4 in. long. The heart was slightly enlarged and weighed 13 oz. The left ventricle showed some hypertrophy; no macroscopic fibrosis. There was a moderate amount of atheroma of both coronaries, particularly the right, and at the commencement of the aorta; the lungs were acutely congested and œdematous and weighed 26 oz. (right) and 24 oz. (left); the liver, spleen, and kidneys were congested; the bladder and ureters were normal. The uterus contained a fœtus of 8 1/2 months. A complete toxicological examination of the organs was negative. There was no hypoplasia of the aorta. As the pericardial effusion of blood leads to death within a few minutes—usually, though by no means always, by compression of the heart and large veins—it must be supposed that the cerebral hæmorrhage occurred first.

Kehrer in his comprehensive monograph[2] does not mention a case of coincidental causes of death during pregnancy. Wenger[3] of Sucre, Bolivia, describes a case of incomplete rupture of the aorta and a large fresh hæmorrhage in the area of the basal ganglions and internal capsule. The deceased was 70 years old. He says: "It seems that such an occurrence has not yet been reported."

1. Huchard, H. Maladies du coeur. Paris, 1889; vol. i, p. 229.

South African Police Medico-Legal Laboratories, Johannesburg, South Africa.

R. H. MACKINTOSH
Director.

ACQUIRED IDIOSYNCRASY TO SODIUM *p*-AMINOSALICYLATE

SIR,—The following case is a further illustration of the reaction to sodium *p*-aminosalicylate (P.A.S.) described in your columns by Dr. Cuthbert[1] and others.

A married man, aged 44, suffering from tuberculous epididymitis and pulmonary tuberculosis, was confined to bed at home in Ripon on June 15, 1950. On June 27 P.A.S. was started in a daily dosage of 7·5 g., increased on July 1 to 10 g. The drug was withheld every seventh day.

On July 4 the man vomited four times; 'Benadryl,' 50 mg. t.i.d., was given. Next day the vomiting had ceased, but there was a generalised erythema with severe pruritus. On the 6th he vomited three times; pruritus was still severe; P.A.S. was discontinued. On the 7th he felt generally better. On the 13th he vomited once at 3 A.M., but P.A.S. was recommenced with 5 g. daily. On the 14th he vomited about six times in the night, but vomiting ceased by the 16th. On the 23rd the dose of P.A.S. was raised to 7·5 g. daily. On the 29th the drug was stopped for two days, after which the daily dose was increased to 15 g. On Aug. 2 he vomited twice in the night. The P.A.S. was stopped next day and vomiting then ceased. From Aug. 4 he was again given 15 g. of P.A.S. daily. On the 6th he vomited once. From the 9th he was allowed out for half an hour morning and afternoon.

On Aug. 20 he travelled to Whitby, taking a supply of P.A.S. with him. During and after the journey he vomited several times, but walked about a mile in the evening. On returning home he felt ill, shivered, and had a headache. On getting to bed he sweated profusely.

When seen on Aug. 23, he complained of frequent vomiting and severe occipital headache. His skin was flushed and moist with sweat, and he appeared acutely ill; temperature 104°F. A generalised rubelliform macular erythema was present. No enlargement of the cervical glands could be detected. P.A.S. was discontinued, a total of 480 g. having been administered. Next day vomiting persisted. The vomitus at first contained blood-clots and later some blood-stained mucus. On the 25th he felt better and had stopped vomiting. He was now afebrile and the rash had faded, but there was a faint icterus, best seen in the sclerotics. The liver was enlarged two fingerbreadths below the costal margin and was slightly tender. The urine was dark; Gmelin's test showed the presence of bile-pigment. On Aug. 27 his jaundice was slightly deeper, but his general condition had improved, and his appetite was returning. There was no desquamation. On the 31st there was further improvement; the liver edge was now only just palpable.

On Sept. 1 the urine was reported on as: acid, slight trace of protein, no sugar or acetone; few hyaline and granular casts; no red cells, spirochætes, or other organisms; sterile on culture. Blood findings were: Hb 86% (Haldane), red cells 4,850,000 per c.mm., colour index 0·9, white cells 5600 per c.mm. (neutrophils 53%, eosinophils 11%, basophils 1%, lymphocytes 30%, monocytes 5%). Serum-albumin:

2. Kehrer, E. Der unvermutet schnelle Tod in Schwangerschaft, Geburt, und Wochenbett. Stuttgart, 1934.
3. Wenger, F. *Arch. Path.* 1943, **36**, 253.

4·4 g., total proteins 6·0 g. per 100 ml. van den Bergh reaction: direct, positive, delayed 1 min.; indirect, 4 units. Thymol turbidity, 1. Cephalin cholesterol positive.

On Sept. 6 the icterus had disappeared but he complained of intense itching, mainly on the soles of his feet.

On Sept. 12 patch tests were done with 20% P.A.S. solution, with 20% streptomycin solution and with a saline control. All three gave a negative reading after 24 hours.

Shortly afterwards the man left my care and returned home. I understand that he has since made fairly good progress and was doing light work early in November. He had had no more P.A.S.

The sodium P.A.S. in this case was at first given in tablets of 0·5 g. and from July 31 in 3 g. cachets. The tablets and cachets had been specially ordered and were fresh; there did not seem to be any possibility of deterioration.

The patient denied having ever had a blood-transfusion. He had had a course of penicillin injections in 1947, and a second course from April 11 to 18, 1950, in which a rash had appeared, though with the help of anti-histamine drugs it was possible to complete the injections. Neither the patient's doctor nor his partners knew of any case of infectious jaundice in the neighbourhood during the six weeks before his visit to Whitby.

The acute feverish illness, with severe headache and erythema, followed in five days by jaundice, may reasonably be ascribed to an acquired P.A.S. sensitivity. The eosinophilia of 11% indicates an allergic reaction. The alternative of infective hepatitis does not seem likely in view of the clinical findings and the absence of a known source of infection. Weil's disease was excluded by the urine examination, and again no source of infection was discovered. Serum jaundice may be ruled out since the man had not received any injections within four months of the onset of jaundice.

The patient shows a well-marked tendency to allergic reactions, illustrated by the rash in his second course of penicillin injections. The first reaction to P.A.S., which appeared nine days after the start of treatment when a total of 80 g. of P.A.S. had been given, consisted only of erythema and pruritus. The reaction 58 days from the beginning of treatment, when 480 g. of P.A.S. had been given, was much more severe. The 5 cases of P.A.S. sensitivity already described also show this apparent relation between the severity of the reaction and the amount of P.A.S. administered.

In Cuthbert's case, where the complications (erythema, fever, severe jaundice, and anuria) were the most severe and of longest duration, the total of 720 g. of P.A.S. was the greatest amount in all that any of the cases had received.

The cases of Climie [2] and of Morrison [3] developed fever and erythema only; the former had received 324 g. and the latter 308 g. of P.A.S. (calculated from the data.)

The case of Livingstone and Street [4] had headache and high fever, followed by jaundice, a macular rash, and finally anuria; in severity this was second only to Cuthbert's case; the amount of P.A.S. (560 g.) was also the second highest in the series.

The case of Scott and McCann [5] developed a macular rash and high fever followed by urticaria and later a mild jaundice; 380 g. of P.A.S. had been given (calculated).

A common finding in these cases is the absence of vomiting and diarrhœa during the administration of the drug. Cuthbert found that cases in which these symptoms are absent usually have a high blood-P.A.S. level, and this may be a necessary condition for the development of a severe reaction; further observations are required on this point. In the present case, though at times vomiting was a prominent symptom, the patient only vomited once during the 20 days before the severe reaction, when his daily intake of P.A.S. was 15 g.; in this period his blood-P.A.S. level would have been steadily rising, and it probably reached its highest peak at the time of the reaction.

1. Cuthbert, J. *Lancet*, 1950, ii, 209.
2. Climie, H. *Ibid*, p. 308.
3. Morrison, J. B. *Ibid*, p. 308.
4. Livingstone, R., Street, E. W. *Ibid*, p. 308.
5. Scott, A. B. A., McCann, J. J. *Ibid*, p. 366.

My thanks are due to Dr. A. C. Brown, of Ripon, who kindly verified the earlier part of the case-record, which was obtained from the patient's own notes; and to Dr. K. Froome, pathologist to Scarborough Hospital, for his help with the investigations.

Whitby. J. D. LITTLE.

CORONARY DISEASE AND MODERN STRESS

SIR,—According to Professor Platt (Jan. 6) the premises assumed in my article of Dec. 23 are "very controversial." He thus includes in this category the statements that there has been "a vast increase in coronary disease during the present century," and that the "malady strikes predominantly men in middle life."

Terminology must, surely, be the cause of my failure to secure these limited concessions. Indeed the phrase "coronary disease" is far from satisfactory. I resorted to it in the same sense, and for the same reasons, as those given by Dr. Morris in his article of Jan. 6. My own brief definition was "coronary atheroma and its syndromes." By "coronary disease," therefore, is implied not an isolated pathological entity but two main clinical concepts —those of "angina" and of "coronary thrombosis"—occurring in association with coronary atheroma, clinical "thrombosis" further being accompanied usually by the morbid appearances of infarction, with or without an evident clot. Gross coronary atheroma does not alone constitute "coronary disease." That such a finding is common in the absence of any previous indication of angina was mentioned by Osler in his textbook. Dr. Morris now suggests that coronary atheroma may have become less in recent years, though whether this generality applies to the incidence of premature plaques appearing selectively close to the left coronary bifurcation must be doubtful. By contrast "coronary disease" has indeed become more widespread. The best evidence for this would appear to be much the same as that which convinces historians that there was a sharp increase of plague during 1665—that is, recorded clinical experience.

With this definition the statement that coronary disease affects predominantly middle-aged men would appear not unduly controversial. In support of the postulate that brain-workers are more threatened than their fellows I quoted the Registrar-General's Decennial Supplement for 1931, which shows a selectively increased incidence among professional people. Professor Platt now confronts me with a further excerpt from this treatise:

> "Degenerative disease in the heart affects all classes of males to much the same extent, but whereas amongst men whose social conditions are most favourable it tends to express itself as angina pectoris or coronary disease, at the other end of the scale it tends to take forms described on death certificates as myocarditis or myocardial or cardiovascular degeneration."

This pronouncement, says Professor Platt, renders the occupational figures "almost meaningless."

So far from discrediting them I maintain that it does much to fortify them. Angina pectoris is a good honest symptom, fairly easily recognised, and known to be associated nearly always with coronary atheroma. It thus virtually identifies coronary disease. Without autopsy the only certified cause of death that can have any value must be founded upon some such reputable clinical grounds. If, therefore, the term "angina pectoris" appears most often upon the certificates of men whose "social conditions" were "most favourable," is it not reasonable to assume that this is because such people

suffer relatively more from coronary disease? "Myocarditis," "myocardial degeneration," and the rest, provide the small change of certification. They do very well in default of anything much to go on. Now these expressions, it seems, are found particularly at the "other end of the scale." Is it not possible that their very presence implies the absence of any striking past manifestations such as those of the coronary ischæmic syndromes, that in fact the people whose deaths they purport to explain, though they may have had coronary atheroma if anyone cared to look for it, did not suffer from coronary disease? It can scarcely be suggested that the Registrar-General, or any of his henchmen, would so far desert his proper sphere as to hint that doctors weigh the social standing of their late patients before awarding them appropriate causes of death. Neither can it be valid to maintain that, in 1931, only a consultant could be expected to make an accurate diagnosis of this form of heart-disease. In that year a consultant, who probably even then would see in public wards many more patients than he saw in private, would have been likely enough to miss a coronary thrombosis, or to call it angina. The deaths of those relatively few victims who succumbed to it without previous chest pain he might well have found almost as inexplicable as did his general-practitioner colleagues. He, too, might have resorted to the myocardial-degeneration formula. On the other hand, though for long it remained rare, angina had been described in England by Heberden at the end of the 18th century, and its coronary association recognised by Jenner. Most practitioners would certainly be familiar with it. What, in working-class life, apart perhaps from birth and death, could be more calculated to result in a call to the doctor than an unheralded, frightening, and crippling affliction of the bread-winner? If such a call was seldom made the implication is that its occasion seldom arose.

Within their limitations, then—and it can scarcely be maintained that this form of statistics is completely worthless—the Registrar-General's figures, together with his enlightened observations, would seem to support my contention that the better-educated, and the personally ambitious, suffer coronary disease more than do manual labourers.

From Dr. Geiringer (Jan. 13) I gather that I am a victim of sublimated Da Costa's syndrome. But he misunderstands me. The division which exists in England today between two attitudes of mind has nothing to do with moral values. For all I know, or care, industry may be a vice and idleness a virtue. And I offer no theories upon ætiological mechanisms. I merely point a parallel.

University of Bristol. I. McD. G. STEWART.

RECENT HISTORY OF CORONARY DISEASE

SIR,—In his article (Jan. 6 and 13) Dr. Morris has brought forward a very interesting fact—that, despite the sevenfold increase in the number of cases of occlusive coronary heart-disease, there has been during the same period a substantial decrease in advanced coronary atheroma, as defined by the report of calcified lesions in the arteries.

However, from this we cannot deduce that occlusive heart-disease may not be due to atheroma without extensive calcification. By way of illustration may I point out that the coronary vessels tend to be constricted during cardiac systole, thus reducing the flow in them and predisposing to thrombosis. It will be apparent that if the vessels are calcified this advanced condition will tend to keep them patent, thus reducing the possibility of thrombosis. Coronary occlusion can thus still be due to non-calcified atheroma.

Ilford. I. GORDON.

Obituary

GEORGE ERNEST GASK

C.M.G., D.S.O., M.A. Oxfd, F.R.C.S., Hon. F.A.C.S.

Professor George Gask, who held the chair of surgery at St. Bartholomew's Hospital from 1919 to 1935 and was director of the first professorial surgical unit of the University of London, died on Jan. 16 at his home at Hambledon at the age of 75.

He was educated at Dulwich College, and after spending some time abroad at Lausanne and Freiburg, he entered Barts in 1893, qualifying five years later. From his first appointment as house-surgeon to John Langton he held a succession of junior posts before his election to the staff in 1907, and for several years he lived at the hospital as warden of the medical college.

When war broke out in 1914 he was established as a consultant in surgery, and his bent for chest surgery was already clear. Whether at a casualty-clearing station in France in the early years, or later as consulting surgeon to the Fourth Army, with the rank of colonel A.M.S., he did much to develop the treatment of thoracic injuries. For his services he was four times mentioned in despatches, was awarded the D.S.O. in 1917, and was appointed C.M.G. in 1919. His work on the chest won him the gold medal of the West London Medico-Chirurgical Society.

Gask had early gained a reputation as an accomplished operator, and his gentle methods were in striking contrast to those of many surgeons of his generation who thought speed more important than delicate handling of the tissues. But his interests were never limited to his specialty. As he was later to say, he believed a good hospital should be a "seedplot of wisdom," and his interest in medical education was keen and creative. After the war his personality was one of the factors that led to the establishment of the first professorial surgical unit at Barts, and the success of this experimental unit was his justification. How much it owed to him is explained by J. H.

"Gask had a remarkable quiet, easy, and friendly manner with everyone, whether it was a colleague, a visiting surgeon, or a junior dresser, but behind this exterior there was at times great force and persistence in carrying out some project or new piece of work which continued until it was completed. He had the knack of choosing good men and gathering them round him on the professorial unit and then giving them a free rein to develop their special interest and work. And thus the unit became a live concern."

As in all live concerns, the flavour of the unit was spiced by the endearing foibles of its chief. Gask had been a keen mountaineer—he was a former secretary of the Alpine Club—and he remained an enthusiastic walker even in London.

"It was a familiar sight," J. H. continues, "to see him arriving on foot at Barts at nine o'clock, or before, having walked the whole way from his home in Regent's Park, and ready to start a morning's operating. All who worked at his unit will remember him in his characteristic garb of a bath towel thrown over his shoulders as he walked about the operating-theatre between cases. A careful conservative operator, he was always outwardly calm, and if difficulties arose he only became calmer."

Indeed, as someone else once said:

"A really desperate situation would be the signal for packing off the wound and smoking a mental cigarette. His younger assistants he would instruct never to run or even hurry across the Hospital square. No emergency, he would imply, could justify so hasty an approach. If the surgeon was not calm the patient would suffer, and Gask's considera-

tion for his patients . . . was always near the surface of his mind."

R. M. V. adds to the picture:

"Gask was a quiet accurate teacher. He was also a strict disciplinarian with a well-developed sense of time. When he was on duty, it was his custom to go round the boxes and remonstrate with any dressers who were habitually late. As a professor he was essentially a devolutionist. He always saw to it that all the members of his unit had plenty of work to do and plenty of responsibility. And thus he trained many generations of first-class surgeons."

Soon after Gask took charge of the unit at Barts he began to invite a distinguished surgeon to take his place for a fortnight each alternate summer: Harvey Cushing, Moynihan, Grey Turner, David Wilkie, Max Page were among these professorial visitors. The comradeship which began at home did not end there, and he was the moving spirit and adroit courier who made possible the Pilgrim Surgeons' visits in the '30s to European centres of surgery. One of his fellow pilgrims recalls how:

"With Cuthbert Wallace as the born compère, a visiting team of ten or more teachers worked and played with home teams of medical schools of Western Europe, learning each other's techniques and coining a common currency. Gask's staff work was behind all this, and his success as a breaker of barriers has been ascribed to his calm unworrying temperament. He saved time and effort by not getting excited. He was probably unaware of this, but he had an instinctive distrust of enthusiasm in medicine, using the word in the sense Monsignor Knox attaches to it in religion."

His close relationship with his colleagues abroad was appropriately reflected in his honorary membership of surgical bodies in America, France, and Italy.

Outside his hospital, but within his specialty, lay his work for the *British Journal of Surgery*, which was commemorated in a special issue of the journal last July. He was elected to the editorial committee in 1919, and from 1936 to 1947 he was chairman. The birthday tribute to him contains the following passage:

"In directing the affairs of the *Journal* Gask showed again his capacity for the quiet and effective management of his fellow men, and for the broadminded enrolment of all who could help in forwarding the interests of British surgery."

To this end he arranged for Elliot Cutler, consulting surgeon to the American Forces in Europe, to be appointed to the editorial committee, and later he enlarged it to contain representatives of anæsthetics, pathology, ophthalmology, and industrial medicine, and of the provincial and municipal non-teaching hospitals.

He had a great enthusiasm for good clinical records and the follow-up clinic. In Changing Surgery, his presidential address to the Medical Society of London in 1935, he said:

"It is abundantly clear that what the medical profession needs are reliable records. It should be furnished with the results of various types of operation performed, and it needs these in large numbers. What is required are statistics of a comprehensive and national character and not merely the figures of a few gifted and energetic individuals."

He realised that a satisfactory disease classification was the first requisite, and again he became the catalyst. He encouraged Dr. Percy Stocks of the General Register Office to see whether a morbidity classification could not be drawn up; out of this developed the Medical Research Council's Provisional Classification of Diseases and Injuries, which was one of the main foundations for the World Health Organisation's International Statistical Classification of Diseases, Injuries, and Causes of Death which was adopted in 1948. Beside his membership of the Medical Research Council, he also served on the Radium Commission and on the council and as a vice-president of the Royal College of Surgeons. He delivered before the college Hunterian, Bradshaw, and Vicary lectures, and before the Medical Society of London the Lettsomian lectures on Surgery of the Lung and Pleura. As collaborator for the succeeding editions of his textbook on *Surgery* he had first W. G. Spencer and later H. W. Wilson. His co-author in *Surgery of the Sympathetic Nervous System* (1934) was Paterson Ross who succeeded him in his chair.

When war came again in 1939 it was unthinkable that Gask would continue in retirement at Hambledon, growing lilies and sitting on the magistrates' bench; he gladly accepted Sir Farquhar Buzzard's invitation to help with the teaching in the Oxford clinical school which had been established at the Radcliffe Infirmary almost overnight; and so it was that a new generation of medical students came to know "Uncle George," his clear exposition of the basic principles of surgery, and his leisured operative skill. On going to live in Oxford, he was made a member of Christ Church senior common-room, and he received the degree of M.A. by decree in 1940. He found as great a pleasure in the conversation of the canons and students as they found in him; the atmosphere stimulated his studies into the history of science, and it was at this time that he wrote his essays on the *Early Medical Schools of Greece and Rome* and began work on his unfinished biographical dictionary of ancient Greek physicians.

Buzzard soon realised that he had brought to Oxford not only an excellent teacher of surgery but also a man of vision and ideas about hospital coördination. Gask became a member of the medical advisory council of the Nuffield Provincial Hospitals Trust and chairman of the medical advisory committee of the Berks, Bucks, and Oxon Regional Hospitals Council. He spurred his committee to action, to collect information, and, in the light of the facts, to plan for the future. Soon memoranda appeared—which were not only of value for the local services but served as models for other centres—on a cancer service, which estimated for the first time the incidence of cancer in terms of the living population and so showed the needs for beds and special equipment; on a comprehensive maternity service; and on child health services. Again it was natural that Gask should take part in the hospital surveys initiated by the trust and the Ministry, for as a regional adviser in surgery to the Ministry he had gained an intimate knowledge of the hospitals of his area. When the wounded, evacuated from Dunkirk, came to the Oxford hospitals, he was ready with help and advice, and he played a big part in the later plans when air transport was used for bringing casualties from Northern France to Wiltshire.

Gask renewed one of his earlier interests by his share in the establishment of the Trust's bureau of health and sickness records at Oxford, and, when the National Health Service came into being, he, as chairman of the medical advisory committee of the Oxford regional board, persuaded the officers of the board of their need for accurate statistical information which the bureau could provide.

"It was impossible," writes A. H. T. R. S., "to expect a man even of Gask's stamina, to continue all his activities untrammelled, and as his health began to interfere with his enthusiasm, he had, unwillingly but with a good grace, to give up things; first it was his teaching, then the chairmanship of some of his committees, then the chairmanship of the medical advisory committee, and lastly the chairmanship of the bureau committee. But enforced retirement from active membership of a committee did not mean loss of interest, and letters would arrive starting 'What are you going to do about this?' or 'Isn't it time so and so was finished?' and there were delightful afternoons at Hambledon in the garden or looking over the Chilterns when plans would be hatched with the aid of Mrs. Gask's scones and quince jelly. Some little time before his 75th birthday, Gask's friends felt a fitting present would be the publication of some of his historical essays, and friends from all over the world subscribed; the secret was well kept, but the presentation of a bound copy of the book was wisely a simple and homely birthday party in his bedroom. His pleasure was great, at the thought, and for the book; but most of all there was surprise that so many people should wish to join in expressing their admiration and affection for him. His modesty was as fundamental a facet of his character as was his enthusiasm and honesty, and, as he said in Changing Surgery, which in a way expresses his professional credo, 'Let us remember the story of the race of the torch. They were not always the fastest runners who kept their torch alight.'"

In 1913 Professor Gask married Ada Alexandra, daughter of Lieut.-Colonel Alexander Crombie, C.B., I.M.S. She survives him with one son, Dr. John Gask.

SIDNEY PHILIP PHILLIPS

M.D. Lond., F.R.C.P.

To write of Sidney Phillips is almost to write of another age; for he qualified in 1877, and when he died on Jan. 19 in his 100th year he was the second senior fellow of the Royal College of Physicians. For many years he was treasurer of the college, and, sitting in the censors' room overlooking Trafalgar Square, he used to recall that he was one of the volunteers who lined the square in the demonstration of 1887 when John Burns was arrested.

Phillips studied medicine at University College Hospital, and after holding the usual house-appointments there he became a demonstrator of anatomy in the medical school. His early intention was to be a surgeon; but at the examination for the London B.S., then distinct from the qualifying M.B., he was set to amputate a much shrivelled toe. To some words of criticism from the examiner, Phillips retorted that the examiner had better do it himself and walked out. So ended his career as a surgeon. It was a characteristic attitude and a story which he always enjoyed telling.

His attention having been thus directed to medicine, he quickly made a name for himself, particularly as an expert on fevers. Another of his stories was how he became a diagnostic expert in smallpox after his fellow house-physician fell a victim: "I had at least seen one case." In due course he was elected to the staff of the Lock Hospital for venereal diseases, Paddington Green Children's Hospital, the London Fever Hospital, and St. Mary's Hospital, where together with the post of assistant physician he had charge of the children's department for several years. He was elected F.R.C.P. in 1891.

Later, when he was full physician at St. Mary's, all students went to Edmund Owen for instruction in surgery, and as inevitably to Sidney Phillips before taking their final in medicine. His teaching was direct, clear, and emphatic, and he used the gruelling method of question and answer. His students went to him knowing well that their ignorance would be plainly exposed, but also that they would learn much that would be useful not only for the looming examination but also for their future practice of medicine. He held examinerships for the Conjoint Board and the University of London.

He was a brevet colonel in the 1914–18 war, when he had already resigned from St. Mary's at the age of 65. During that war his keen observation and ready deduction led to the arrest of a notorious German spy. In later years he was always pleased to declare he identified the spy by his Blücher boots.

When he became treasurer of the college in 1924 he proved himself an efficient and astute financier. He kept all accounts himself, writing them out by hand, until failing sight made resignation inevitable in 1938. In his last years he was totally blind, but his mind remained alert.

Although he never published a book, he wrote many papers on fevers, gastro-intestinal diseases, and disorders of the heart and circulation. When acute ulcerative colitis was beginning to be recognised as a clinical entity," F. L. recalls, "Phillips described a series of patients whom he had attended—including the late F. J. Poynton then recently qualified. Phillips's teaching and writings on syphilis of the heart formed much of the background of Carey Coombs's lecture to the College of Physicians, and when William Pasteur in 1908 gave a Bradshaw lecture before the same college on massive collapse of the lung, Phillips supplied him with notes of several illustrative cases.

"An accurate observer and clear thinker, his diagnosis, based on the old methods, seldom went astray. Though he never failed to attend a post-mortem of one of his own patients, he had little respect for those he dubbed 'test-tube' physicians, and he did not hesitate to say so. Despite his several appointments he found time to visit his wards once a week—in addition to his two teaching rounds—when he would write notes on some of his cases; when the patients were discharged all the notes had to be sent to his house, where they remained, registrars' protests notwithstanding. He had his foibles. He did not believe in diphtheria antitoxin, holding that it increased the incidence of polyneuritis, and he always operated upon his own empyemas, without resection of ribs, on the coal chest in the children's ward—with great success.

"He had a fund of anecdote. The stories about him were legion and enjoyed by none more than by himself, whilst his caustic humour did not always escape repercussions to which he was completely immune. There must be many of the older generation who remember him as a character not likely to be met with again, not lightly to be crossed but with a wealth of friendliness and good counsel; and many who owe much to his teaching and help."

MR. C. E. WEST

E. B. B. writes: "Your obituary of Charles Ernest West mentions his fearless speech. In fact he was a man of outstanding courage in every way. His surgical courage matched his extreme skill. If operation was a patient's only hope, West would operate, no matter how slender the hope might be. His skill gave great speed when that was the patient's need. I have seen him perform a really good radical mastoid on a patient whose breathing had ceased, and open a cerebellar abscess in 13 minutes from start to finish. For those who worked for him perhaps his outstanding characteristic was his loyalty to his team. West would take the blame for anything that went wrong and he would side with his junior against anyone on earth. His outspokenness and a certain mischievous love of debunking the pompous militated against a universal popularity, but those who were responsible to him in their work, and also his patients, loved him. After his early retirement his strength and skill were such that he used to work a six-ton cutter round the Cornish coast single-handed, rejoicing openly in the risk so that it was only to himself. About two years later he tore every muscle off a tendo Achillis while playing badminton. This reduced him from sail to what he called water-motoring, but I never heard him grumble. After his second marriage he took up the clarinet and he and his wife used to play duets. An invigorating and amusing companion, intensely alert and alive to the end, he was also a most amusing correspondent."

Appointments

ADAMS, MARY, M.B. Belf., D.P.H.: M.O.H., Fulham.
ANDERSON, W. L., M.B. Glasg.: tuberculosis physician, Manchester Chest Clinic.
DAVIDSON, C. H., M.B. Edin., M.R.C.P.E.: asst. physician, Leith Hospital.
DICKSON, WALTER, M.B. Manc., M.R.C.P., D.C.H.: consultant pædiatrician, Bolton and Wigan hospital groups.
GREENBERG, M. J., M.A., M.B. Camb., M.R.C.P.: consultant chest physician, Manchester Chest Clinic and Baguley Hospital.
MACKAY, R. I., M.B. Manc., M.R.C.P., D.C.H.: consultant pædiatrician, Salford.
MITCHELL, E. J., M.B. Manc., D.O.: consultant ophthalmic surgeon, Blackburn hospital group.
MOORE, JOHN, M.B. Dubl., D.A.: asst. anæsthetist, Wigan and Leigh hospital group and Wrightington Hospital.
MOSS, P. D., M.B. Lpool, M.R.C.P., D.C.H.: consultant pædiatrician, Blackburn and Burnley hospital groups.
ROBERTSON, J. D., M.B. Edin., D.A.: anæsthetist in regional pool of anæsthetists based on Royal Infirmary of Edinburgh.
SMITH, A. E., M.B. Edin., D.A.: asst. anæsthetist, Barrow and Furness hospital group.
WILLIAMSON, JAMES, M.B. Glasg., M.R.C.P.E.: tuberculosis physician, area of counties of East Lothian, Berwickshire, Selkirkshire, and Roxburghshire.
WILSON, J. M. G., M.B. Camb., M.R.C.P.: asst. physician, Deaconess Hospital, Edinburgh.
WOODS, R. R., M.B. Dubl., F.R.C.S.I.: consultant ear, nose, and throat surgeon, Oldham and Ashton hospital groups.

Colonial Service:

APTED, F. I. C., M.B. Lond., D.T.M. & H.: sleeping-sickness specialist, Tanganyika.
BARRETT, R. E., M.B. Lond., D.P.H., D.T.M. & H.: deputy director of medical services, Tanganyika.
CALDWELL, J. M., M.B. Dubl., D.P.H., D.T.M. & H.: senior M.O., Uganda.
DEAN, N. M. B., M.B. Edin., F.R.C.S.E.: surgeon specialist, Nigeria.
GOODALL, J. W. D., M.D. Edin., F.R.C.P.E.: medical specialist, Nyasaland.
HEALY, S. J., L.R.C.P.I.: M.O., Nigeria.
HUTCHISON, A. F., M.B. Durh.: M.O., Tanganyika.
MAGILL, C. W., M.B. Edin.: M.O., Tanganyika.
O'BRIEN, NORAH, L.R.C.P.I.: M.O., Tanganyika.
PILSZAK, BRUNON, MED.DIP.LWOW: M.O., Windward Isles.
SABA, CHARLOTTE, M.B. Lond., D.OBST.: obstetrical gynæcological M.O., Nigeria.
SCHUPPLER, V. J., M.D.: M.O., Tanganyika.
TERESHCHENKO, I. N. N., F.R.C.S.: asst. surgeon, Public Hospital, British Guiana.

Notes and News

MEDICAL EXPENDITURE

THE cost of medical care is somewhat higher in the U.S.A. than in Great Britain, relative to consumption expenditures, to national income, and to income per head of population. This conclusion was reached by Mr. Seymour E. Harris, PH.D., professor of economics in Harvard University, when he addressed the American Economic Association in Chicago last month. He found that in Great Britain (1950) and the U.S.A. (1949) the cost of health services was as follows: percentage of total consumption expenditure, Britain 4·5 and U.S.A. 5·0; percentage of personal income, Britain 3·7 and U.S.A. 4·4 (the figures for medical expenditure per head as percentage of income per head were also 3·7 and 4·4). Professor Harris remarked that under the National Health Service more money had been canalised into medicine. "By virtue of its taxing power, the Government forces the nation to spend more on medicine and less on other consumption goods or possibly on investment." Taking the figures for 1938 as 100, expenditure on various goods and services in Britain during 1948 is shown in the following figures, together with the prices of these goods and services.

	Expenditure	*Prices*
Tobacco	112	388
Alcoholic drinks	93	288
Durable household goods	79	236
Private motoring	35	180
Domestic services	37	218
Other services	120	154
All	104	182

"It is clear," said Professor Harris, "that large rises of prices in relatively non-essential areas of consumption have tended to reduce consumption of these non-essentials. When prices have risen greatly and consumption has increased or has been maintained remarkably well, the explanation is inelastic (insistent) demand. The rise of prices in these sectors of the economy stems largely from tax policy. For example, the increase of consumption for tobacco was 12%, of prices 288%, but the rise of prices after allowing for the increase of taxes was but 50%. From 1938 to 1948 tobacco taxes rose from £84 million to £610 million. . . . All of this suggests that the British Government by a conscious tax and, to some extent, price policy has tended to discourage the consumption of tobacco, alcohol, durable consumers' goods, &c., and use part of the receipts to stimulate the outlay on medicine. . . . Few will dispute the fact that the diversion of spending from alcohol, tobacco, radio, &c., to medicine brings an improved pattern of spending. But many in this country will not approve governmental intervention in the field of consumption."

INTERNATIONAL CONGRESS ON CHEST DISEASES

THE First International Congress on Diseases of the Chest, sponsored by the council on international affairs, American College of Chest Physicians, was held in Rome between Sept. 17 and 22, and was attended by about a thousand delegates and their wives. At the inaugural session the college medal was presented to Sir Alexander Fleming, F.R.S., for his discovery of penicillin. Altogether more than a hundred scientific papers were presented by physicians from forty countries, including the U.S.S.R. Delegates from Great Britain included Sir Harold Boldero, Dr. A. J. Benatt, Dr. C. K. Cullen, Dr. W. Griffel, Dr. W. Paton Philip, Dr. R. R. Trail, and Dr. M. Weinberger. A European chapter of the college was organised with Dr. André Meyer (Paris) as the general secretary. The regents of the college in Europe who will serve as the executive council for the chapter are Prof. Gustav Maurer (Davos, Switzerland), Prof. Etienne Bernard (Paris), Prof. Lopo de Carvalho (Lisbon), Prof. Nicholas Oekonomopoulos (Athens), Prof. Eugenio Morelli (Rome), and Sir Alexander Fleming.

EMPIRE RHEUMATISM COUNCIL

THE report by Lord Horder, the chairman, presented at the annual meeting of the Empire Rheumatism Council in London last Wednesday, declares that this body was active in the new and revolutionary field of research opened up by the discoveries of Dr. Philip Hench and his colleagues in the U.S.A. At the Westminster Medical School, in work aided by a grant from the council, good progress was being made towards the preparation of 'Cortisone' analogues; and the council was publishing a critical quarterly bibliography of cortisone, A.C.T.H., and related hormonal substances. As to the council's education programme, the postgraduate courses held at the Apothecaries' Hall had again been fully attended. Inquiry had been made as to the number of physicians of registrar or senior-registrar status who were members of the Royal College of Physicians and had at least two years' training in some recognised rheumatic treatment centre, and for whom no consultant posts in this specialty were at present available; in October, 1950, there were some 15 such senior registrars.

The finance committee reported that in 1949–50 ordinary income amounted to £12,222 and legacies brought in £6240 the total expenditure rose to £10,243.

Royal College of Physicians of London

Dr. J. C. Broom will deliver the Milroy lectures on Tuesday and Thursday, Feb. 13 and 15, at 5 P.M. at the college, Pall Mall East, S.W.1. He is to speak on Leptospirosis.

Hunterian Society

The annual dinner will be held at Claridge's, Brook Street, London, W.1, on Thursday, Feb. 15. Tickets (30s.) may be had from Mr. A. W. Badenoch, 110, Harley Street, W.1.

The subject for the 1951 gold-medal essay is the Treatment of Asthma in General Practice. The competition is open to all general practitioners. Further details may be had from the honorary secretary, Mr. Clement Francis, 75, Wimpole Street, London, W.1.

Heberden Society

Sir Henry Cohen has been elected president of this society for 1951.

Scottish Health Services Council

Prof. J. M. Graham, F.R.C.S.E., Dr. W. Nicol Gray, Dr. G. W. Ireland, Prof. G. L. Montgomery, F.R.F.P.S., and Dr. E. Neil Reid have been appointed members of the council; Dr. A. D. Briggs and Dr. R. C. Scott Dow, L.D.S., have been reappointed. All will hold office until Dec. 31, 1953.

British Association of Physical Medicine

The association is to hold a meeting in London on Friday and Saturday, April 20 and 21. The programme will include a lecture-demonstration by Dr. A. C. Boyle on Micro-waves and a demonstration on Ultrasonics. A visit will be made to the R.A.F. rehabilitation centre at Headley Court, Epsom. Further particulars may be had from Dr. W. S. Tegner, the hon. secretary, 45, Lincoln's Inn Fields, W.C.2.

Ophthalmic Services

Meeting in London on Jan. 17, the general council of the Association of Optical Practitioners called on the Minister of Health to establish the existing supplementary ophthalmic service on a permanent basis, like the medical and dental services. A further resolution urged members of the association not to take a post in the hospital eye service unless the hospital authority concerned declared its intention "that the refraction of non-pathological cases shall be actively discouraged." Mr. L. Evershed-Martin, chairman of the council, told a press conference that it had been estimated that only 50% of opticians would be used in the hospital scheme. The remainder "would be out of practice, with no compensation whatever. . . . The optical profession is walking the plank."

The Minister of Health

The Rt. Hon. Hilary Adair Marquand, D.SC., M.P., has been appointed Minister of Health in succession to Mr. Aneurin Bevan, who becomes Minister of Labour and National Service.

Fifty years of age, Mr. Marquand was educated at Cardiff High School and University College, Cardiff, where he graduated in history and economics. His appointments in this country have included those of professor of industrial relations at University College, Cardiff, lecturer in economics at the University of Birmingham, and director of industrial surveys of South Wales. He visited the United States as Laura Spelman Rockefeller fellow in social sciences in 1925 and as visiting professor of economics at Wisconsin University in 1938. During the war he became successively an acting principal at the Board of Trade, a deputy controller at the Ministry of Labour, and finally labour adviser at the Ministry of Production. Since then he has been secretary for Overseas Trade (1945–47), Paymaster General (1947–48), and Minister of Pensions (1948–51). His writings include *The Dynamics of Industrial Combination* (1931), *Industrial Relations in the U.S.A.* (1934), *South Wales Needs a Plan* (1936), and *Organised Labour in Four Continents* (jointly, 1939).

Mycological Reference Laboratory

Dr. Jacqueline Walker has been appointed acting director of the laboratory on the resignation of Dr. R. W. Riddell. Specimens for examination for pathogenic fungi should be addressed to her at the laboratory, London School of Hygiene and Tropical Medicine, London, W.C.1.

Tuberculosis-free Dairy Cattle

Addressing a conference reported in the *Farmer and Stockbreeder* for Jan. 16, Mr. Ben Hinds, chairman of the Milk Marketing Board, said that 36% of the milk sold last month in England and Wales was from tuberculin-tested cows. In the three counties of West Wales (Carmarthen, Cardigan, and Pembroke) the proportion was 77%. This area has been selected as the first area in Britain for free tuberculin testing under the attested herds scheme.

Medical Artists' Association of Great Britain

Applications for membership of this association will be considered at a meeting of the examining subcommittee on April 6. Forms of application and full details may be obtained from the hon. assistant secretary, Miss Audrey J. Arnott, A.R.C.A., The Rotunda, Radcliffe Infirmary, Oxford. Work for the examination must reach Miss Arnott, c/o Dr. Tompsett, at the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.2, by April 4.

Statistical Research

The World Health Organisation has set up, from Jan. 1, a centre for statistical research on problems arising in the use of the International Statistical Classification of Diseases, Injuries, and Causes of Death, and has appointed Dr. Percy Stocks, until recently chief medical statistician at the General Register Office, to direct its work. The centre is at present situated at the General Register Office, which is providing appropriate material from its records. Dr. Stocks will continue for the present to be available to the department in a consultant capacity.

Use of Preservatives in Food

The Food Standards Committee of the Ministry of Food has set up a subcommittee to consider the use in foods of preservatives, colouring matters, dyestuffs, and allied substances such as anti-oxidants, anti-staling agents, anti-mould agents, stabilising agents, and emusifying agents. The ten members include the following doctors: Prof. E. C. Dodds, F.R.S. (chairman), Dr. N. R. Beattie, Prof. S. J. Cowell, and Dr. J. M. Johnston. The subcommittee may be addressed at the Ministry of Food, Food Standards and Labelling Division, 47, Portman Square, London, W.1.

Hospital Administrative Staff College

Mr. R. A. Mickelwright, F.H.A., and Mr. A. C. Stuart-Clark, M.A., have been appointed by King Edward's Hospital Fund for London as whole-time members of the tutorial staff of the college, at nos. 2 and 14, Palace Court, W.2. Mr. Mickelwright, who will act as senior tutor and director of studies, is resigning his appointment as secretary to the South-West Middlesex Hospital Management Committee. Mr. Stuart-Clark, who will act as senior tutor and registrar, was formerly headmaster of Brighton College. The principal of the college is Mr. P. H. Constable, M.A., F.H.A., house-governor of St. George's Hospital, who will act in a part-time capacity. The first courses will begin at the college in April.

Lady Tata Memorial Trust

The trustees of this fund invite applications for grants and scholarships for research on diseases of the blood, with special reference to leukæmia, in the academic year beginning on Oct. 1, 1951. Grants are made for research expenses or to provide scientific or technical assistants for senior workers. Scholarships are awarded as personal remuneration, and are intended chiefly for junior investigators working under suitable direction; their normal value has been £400 per annum for whole-time research, with proportionate adjustment for work on a part-time basis. The grants and scholarships are open to workers of any nationality, and in any country in which it will be possible to make payments in the coming academic year. Applications must be submitted before March 31, and the awards will be announced by the trustees in June. Forms of application may be obtained from the secretary of the scientific advisory committee, c/o Medical Research Council, 38, Old Queen Street, London, S.W.1.

Renal Association

At a meeting of the association on Wednesday, Jan. 31, at 4.30 P.M., at the Ciba Foundation, 41, Portland Place, London, W.1, Prof. E. C. Amoroso will speak on the Fœtal Kidney, Prof. E. B. Verney, F.R.S., on the Neurohypophysis and the Kidney, and Dr. Dent on Tubular Function.

Memorial to C. J. Bond

On Jan. 10 Prof. G. Grey Turner unveiled a memorial tablet to C. J. Bond in the Leicester Royal Infirmary where he had served as an active surgeon for 27 years and as a consulting surgeon until his death in 1939 at 83. The same evening Professor Grey Turner delivered the first Bond memorial lecture, before the Leicester Medical Society.

Society for Endocrinology

This society will hold a symposium on Endocrinological Aspects of Fertility at the house of the Zoological Society, Regent's Park, London, N.W.8, on Friday, Feb. 16, at 11 A.M. Those who wish to attend should write to Prof. C. H. Gray, department of chemical pathology, King's College Hospital, London, S.E.5, not later than Feb. 10.

Diary of the Week

JAN. 28 TO FEB. 3

Monday, 29th

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5 P.M. Prof. Hamilton Hartridge, F.R.S.: Some Recent Advances in the Neurophysiology of Vision.

Tuesday, 30th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene, Keppel Street, W.C.1.) Dr. F. M. R. Walshe, F.R.S.: Organisation of Muscular Movements by the Cerebral Cortex.

Thursday, 1st

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. Mr. H. J. Eysenck, PH.D.: Psychology of Personality.
LIVERPOOL MEDICAL INSTITUTION
3.30 P.M. (Broadgreen Hospital, Edge Lane Drive, Liverpool, 4.) Clinical demonstration.
UNIVERSITY OF ST. ANDREWS
5 P.M. (Medical School, Small's Wynd, Dundee.) Prof. W. Melville Arnott: Pulmonary Circulation in Man.

Friday, 2nd

UNIVERSITY COLLEGE, Gower Street, W.C.1
5.15 P.M. Mr. T. S. Work, PH.D.: Cell Metabolism and Chemotherapeutic Activity. (First of two lectures.)

Births, Marriages, and Deaths

BIRTHS

ATTWOOD.—On Jan. 20, in Manchester, the wife of Dr. R. W. Attwood—a daughter.
BANKS.—On Jan. 19, in London, the wife of Dr. P. J. Banks—a daughter.
BARROWCLIFF.—On Jan. 15, at Stratford-on-Avon, the wife of Dr. D. F. Barrowcliff—a son.
CARTON.—On Jan. 19, the wife of Dr. Paul Carton—a daughter.
CHILDS.—On Jan. 11, at Southsea, Hants, the wife of Dr. Michael Childs—twin sons.
CRAWSHAW.—On Jan. 16, at Winchester, the wife of Dr. George Crawshaw—a daughter.
EDWARDS.—On Jan. 16, at Stanmore, Middlesex, the wife of Dr. D. N. Edwards—a daughter.
FLOYER.—On Jan. 16, in London, the wife of Dr. M. A. Floyer—a son.
HAY.—On Jan. 16, at Stoke-on-Trent, Staffs, the wife of Dr. R. K. Hay—a daughter.
HUTT.—On Jan. 18, the wife of Dr. C. W. Hutt—a son.
MINTO.—On Jan. 21, at Northampton, the wife of Dr. W. H. P. Minto—a son.
SMITH.—On Jan. 18, the wife of Dr. Sydney Smith—a son.

MARRIAGES

BENN—SIMPSON.—On Jan. 8, in Leicester, Joseph Benn, M.D., to Patricia Mary Simpson, M.B.
MACALISTER HALL—BROOKS.—On Jan. 9, in Edinburgh, Malcolm Macalister Hall, M.C., to Margaret Sheila Brooks, M.B.
WHITAKER—THOSEBY.—On Jan. 13, in Manchester, Tom Whitaker, M.B., to Margaret Rosevear Thoseby, M.B.

DEATHS

BROWN.—On Jan. 18, at Minchinhampton, Alfred Brown, M.D. Edin., aged 72.
GASK.—On Jan. 16, at Henley-on-Thames, George Ernest Gask, C.M.G., D.S.O., M.A. Oxfd, F.R.C.S., aged 75.
HAYES.—On Jan. 11, at Hove, Reginald Hewlett Hayes, M.R.C.S.
PHILLIPS.—On Jan. 19, in London, Sidney Philip Phillips, M.D. Lond., F.R.C.P., aged 99.
RAWLINSON.—On Jan. 14, at West Kirby, Cheshire, James Herbert Rawlinson, M.B. Lpool, F.R.C.S.

protein

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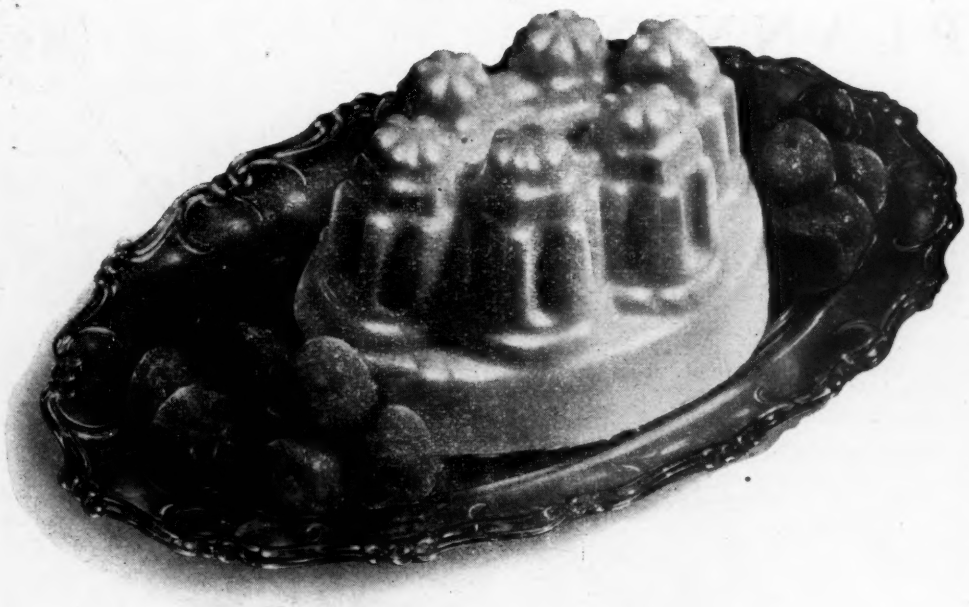

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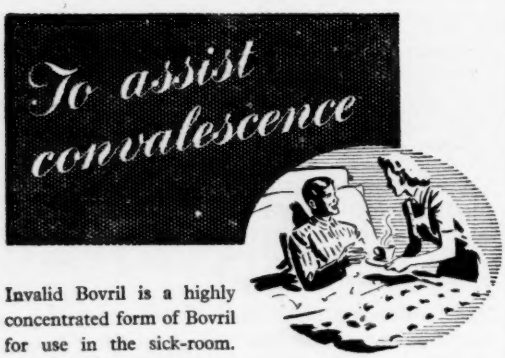

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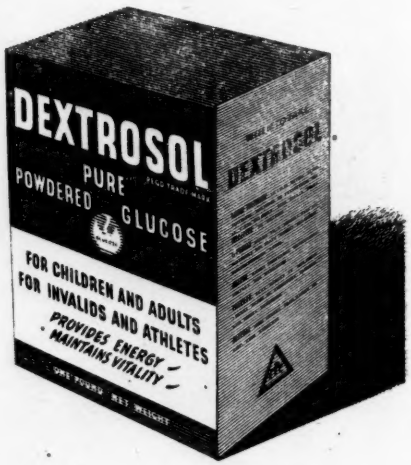

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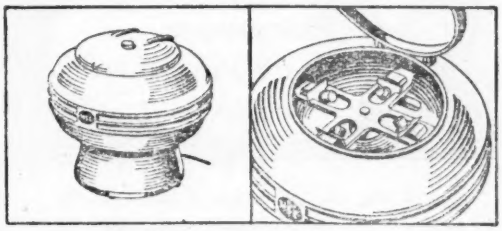

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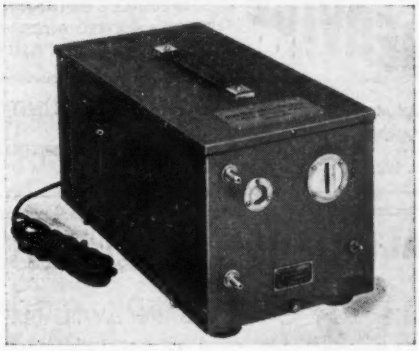

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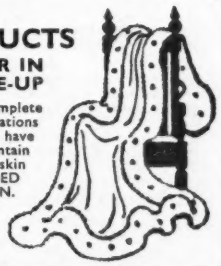

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Thursday, 1st March.

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Thursday, 8th March.

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(Pathology, Medicine, Surgery, and Midwifery)
Wednesday, 28th March.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for Examination, must give notice in writing to the Secretary, Examination Hall, 8–11, Queen-square, London, W.C.1, at least 21 days before the date of the Examination, transmitting at the same time such certificates as may be required by the Regulations of the Board, together with the full amount of the fee due for the subject or subjects for which they desire to enter.

F. M. STENT, Secretary.

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Applications, giving full details of previous experience, and with the names of 3 referees, must be received by the undersigned at the Institute of Child Health, The Hospital for Sick Children, Great Ormond-street, London, W.C.1, not later than 19th February, 1951. G. H. NEWNS, Dean.

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DAVID J. B. RITCHIE, Secretary.

The University, St. Andrews, 20th January, 1951.

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IN THE INSTITUTE OF ORTHOPÆDICS
15TH TO 24TH FEBRUARY, 1951

Thursday, 15th February, Great Portland-street

10.00 A.M.	Rest	Mr. H. J. BURROWS
11.15 A.M.	Posture	Dr. J. JOSEPH
12.45 P.M.	Lunch	
2.00 P.M.	Movement	Mr. H. J. BURROWS
3.00 P.M.	Principles of appliances..	Mr. A. T. FRIPP
4.00 P.M.	Tea	

Friday, 16th February, Great Portland-street

10.00 A.M.	Postural exercises ..	Miss M. MACMURRAY
11.00 A.M.	Electrical treatment of muscle	Mr. H. J. SEDDON
12.00 A.M.	Skin Cover	Mr. D. N. MATTHEWS
1.00 P.M.	Lunch	
2.00 P.M.	Clinical demonstration ..	Mr. H. J. SEDDON
4.00 P.M.	Tea	

Saturday, 17th February, Great Portland-street

10.00 A.M.	Manipulation	Mr. H. J. BURROWS
11.15 A.M.	Demonstration of appliances	Mr. W. TUCK

Monday, 19th February, Country Branch, Stanmore

10.00 A.M.	Bed apparatus	Mr. F. J. HEDDEN
11.30 A.M.	Pool and slings	Miss L. M. PRIOR
12.45 P.M.	Lunch	
1.30 P.M.	Plaster of Paris	Miss DONLAN and Mr. CHOLMELY
2.45 P.M.	Workshops	Mr. W. TUCK
3.15 P.M.	Plastic splints	Dr. J. T. SCALES
4.00 P.M.	Tea	

Tuesday, 20th February, Country Branch, Stanmore

10.00 A.M.	Chemotherapy	Dr. C. H. LACK Dr. F. H. STEVENSON
11.30 A.M.	Cold abscesses and sinuses	Mr. F. J. HEDDEN
12.45 P.M.	Lunch	
1.45 P.M.	Clinical demonstration ..	Mr. F. J. HEDDEN
4.00 P.M.	Tea	

Wednesday, 21st February, Great Portland-street

10.00 A.M.	Arthrodesis	Mr. J. I. P. JAMES
11.30 A.M.	Arthrodesis	Mr. J. I. P. JAMES
12.45 P.M.	Lunch	
2.30 P.M.	Tendon and muscle transfer	Mr. D. M. BROOKS
4.00 P.M.	Tea	

Thursday, 22nd February, Great Portland-street

10.00 A.M.	Nerve repair	Mr. H. J. SEDDON
11.30 A.M.	Nerve repair	Mr. H. J. SEDDON
12.45 P.M.	Lunch	
2.00 P.M.	Tendon repair	Mr. J. I. P. JAMES

Friday, 23rd February, Great Portland-street

10.00 A.M.	Limb equalisation ..	Mr. J. I. P. JAMES
11.15 A.M.	Arthroplasty	Mr. K. I. NISSEN
12.45 P.M.	Lunch	
2.00 P.M.	Chronic osteomyelitis ..	Mr. I. ROBERTSON
3.00 P.M.	The effect of hormones in the treatment of osteoporosis	Dr. J. R. NASSIM

Saturday, 24th February, Country Branch, Stanmore

10.00 A.M.	Ward round	Mr. K. I. NISSEN

The fee for the course (including lunch and tea) is 7 guineas.

Early application should be made to the Dean, 234, Great Portland-street, London, W.1.

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Applications should be made to the Secretary, Institute of Urology, St. Peter's Hospital, Henrietta-street, London, W.C.2.

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The University, Birmingham, 3, January, 1951.

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Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. The closing date for the receipt of applications is 15th March, 1951.

UNIVERSITY OF HONG KONG. Applications are invited for the following new appointment which is occasioned by expansion to the present establishment. Emoluments shown are for married members of the staff normally resident outside Hong Kong or China, inclusive of allowances: SENIOR LECTURESHIP IN ORTHOPÆDIC SURGERY, £1576–£40–£1736 p.a. Applicants must hold a registrable qualification, and should possess a higher degree. The appointment carries Consultant status and consultation fees may be earned under specified conditions. The post is to be filled, if possible, by September, 1951. First-class sea-passages, and furnished houses or flats at reasonable rentals are provided for expatriate staff.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 5, Gordon-square, London, W.C.1. The closing date for the receipt of applications is 15th March, 1951.

Hospital Services : Senior Appointments

CHARING CROSS HOSPITAL GROUP. Applications invited for temporary appointment as Part-time ASSISTANT PHYSICIAN (Consultant status) at the Charing Cross Hospital Annexe at Mount Vernon Hospital, Northwood, Middlesex. Attendance: 4 sessions per week, one of which will be held on Saturday morning, the others by arrangement. The appointment is made in accordance with the terms and conditions of service for hospital medical and dental staffs for the time being in operation, and is subject to the National Health Service (Superannuation) Regulations, 1950. This post will terminate when Charing Cross Hospital ceases to use the Unit at Mount Vernon Hospital and the candidate appointed would not be a member of the Staff of Charing Cross Hospital. Candidates should be Fellows or Members of the Royal College of Physicians of London and it is desirable that they should reside within a reasonable distance of Mount Vernon Hospital.

Applications (12 copies), stating age, qualifications, and experience, and the names of 3 referees, should reach the undersigned not later than first post on 10th February, 1951. Canvassing of members of the Board of Governors or Advisory Appointments Committee will lead to disqualification.

GEORGE J. JONES,
House Governor and Secretary to the Board.

Charing Cross Hospital, Strand, W.C.2.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for an appointment as Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST to undertake 3 sessions a week in the Greenwich and Deptford group of hospitals. Candidates must have had wide experience in obstetrics and gynæcology and be members of the Royal College of Obstetricians and Gynæcologists and Fellows of a Royal College of Surgeons. The appointments will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment, and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day for acceptance of applications will be 9th February, 1951, and selected candidates will be interviewed in London on 15th March, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the hospitals concerned.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of ASSISTANT PHYSICIAN at the above Hospital. Whole-time appointment. This is a very busy general hospital of some 850 Beds, with a large specialist staff and all the usual special departments. Applicants should possess a higher medical qualification, have had wide experience in general medicine, with special interest in diseases of the lungs and cardiovascular system. Experience in teaching would be an added qualification. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Medical Director.

CENTRAL MIDDLESEX HOSPITAL, N.W.10. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of ASSISTANT SURGEON at the above Hospital. Whole-time appointment. This is a very busy general hospital of some 850 Beds, with a large specialist staff and all the usual special departments. Applicants should possess a higher surgical qualification, have had wide experience in general surgery and preferably teaching experience. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Medical Director.

HOSPITALS FOR DISEASES OF THE CHEST. The Board of Governors invite applications for the appointment of Part-time CONSULTANT THORACIC SURGEON to The London Chest Hospital, E.2. The duties require the equivalent of 4 notional half-days a week, including attendances at the Hospitals' Country Branch at Arlesey, near Letchworth. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of present and previous appointments, together with the names and addresses of 3 referees, should reach the undersigned by 17th February, 1951. Canvassing will disqualify, but applicants may visit the Hospitals. F. G. ROUVRAY, Secretary to the Board.

Brompton Hospital, S.W.3.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. HAREFIELD HOSPITAL, HAREFIELD, and COLINDALE HOSPITAL, The Hyde, N.W.9. Applications are invited for the appointment of THORACIC SURGEON at the above Hospitals for 2 to 3 half-days per week at each hospital to include duties in some associated general hospitals. Harefield Hospital has 444 Beds for the treatment of tuberculosis and there is a thoracic surgical unit (non-tuberculous) of 78 Beds. Colindale Hospital has 234 Beds for the treatment of tuberculosis. Candidates should possess a higher surgical qualification and have special experience in thoracic surgery. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 3rd February, 1951. Canvassing will disqualify, but candidates are invited to visit the hospitals by direct appointment with the Medical Directors.

ST. CHARLES' HOSPITAL, Ladbroke-grove, W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of Whole-time ASSISTANT ANÆSTHETIST at the above Hospital. This is a general hospital of about 600 Beds with all the usual special departments. The terms and conditions of service for hospital medical and dental staffs will apply to the post and salary will be on the scale of £1300–£1750 p.a.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 17th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Physician-Superintendent.

Provincial

BARNET CHEST CLINIC, Barnet General Hospital, BARNET, HERTS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the whole-time appointment of ASSISTANT PHYSICIAN at the above Clinic. Candidates should possess a higher medical qualification and have good general medical experience and special experience in the treatment of chest diseases and tuberculosis. The successful applicant will work under the general supervision of the Consultant Physician in charge and duties will be in the modern and well-equipped clinic and in the wards of 20 Beds for tuberculosis in the general hospital. The Clinic also is associated with Clare Hall Hospital, South Mimms, Barnet (approximately 530 Beds for the treatment of tuberculosis). The terms and conditions of service for hospital medical and dental staffs will apply to the post and salary will be on the scale of £1300–£1750 p.a.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Clinic by direct appointment.

BIRMINGHAM REGIONAL HOSPITAL BOARD AND COVENTRY COUNTY BOROUGH COUNCIL. Applications invited joint appointment Whole-time CONSULTANT CHEST PHYSICIAN, Coventry group of hospitals and Coventry County Borough Council. Applicants to possess higher medical qualification and wide experience in tuberculosis. Successful applicant will devote 9/11ths time to Board at King Edward VII Sanatorium and clinical duties Coventry and 2/11ths time to work for Coventry County Borough Council. Remuneration for local authority work will be determined by agreement to be negotiated, otherwise appointment in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 12th February, 1951. Canvassing will disqualify. Candidates may visit Sanatorium.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited appointment Whole-time ASSISTANT DIRECTOR, Birmingham Mass Radiography Centre and to undertake mass miniature radiography services. Salary £1300–£1750. Candidates should possess higher qualification and have considerable experience in specialty. Appointment in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 12th February, 1951. Canvassing will disqualify. Candidates may visit Centre.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited following Consultant appointments :—

(*a*) Part-time ANÆSTHETIST (6 notional half-days) Dudley Road and Selly Oak groups of hospitals, Birmingham ; duties mainly St. Chad's Hospital, Solihull Hospital, and Eastcote Grange. Candidates must possess D.A. and wide experience in specialty.

(*b*) Whole-time PATHOLOGIST Mid-Worcestershire group ; duties mainly All Saints' Hospital, Bromsgrove (291 Beds) and Regional Thoracic Surgical Centre, Hill Top Hospital. Candidates must possess higher qualification and wide experience in specialty.

(*c*) Whole-time PATHOLOGIST Birmingham (Selly Oak) group ; duties mainly Selly Oak Hospital. Candidates must possess higher qualification and wide experience in specialty.

(*d*) Part-time PHYSICIAN (2 notional half-days) West Bromwich group ; duties at West Bromwich and District Hospital (144 Beds). Candidates must possess higher medical qualification and wide experience in general medicine.

(*e*) Whole-time PSYCHIATRIST AND DEPUTY MEDICAL SUPERINTENDENT, Mid-Staffs Mental group ; duties St. George's Hospital, Stafford (1163 Beds), Coton Hill Hospital (137 Beds), and associated clinics. House provided. Candidates must possess D.P.M. and wide experience in specialty.

(*f*) Whole-time or maximum Part-time ASSISTANT THORACIC SURGEON, South Worcestershire, South Warwickshire, Burton-on-Trent, and Coventry groups ; duties at Warwick Chest Unit and under direction of Senior Thoracic Surgeon in groups. Candidates must possess higher surgical qualification and wide experience in thoracic surgery.

Appointments in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 12th February, 1951. Applicants for appointments (*b*) and (*c*) should forward 25 copies of applications. Canvassing will disqualify. Candidates may visit group hospitals.

LEEDS REGIONAL HOSPITAL BOARD invites applications from suitably qualified persons for the appointment of REGIONAL BLOOD TRANSFUSION OFFICER. The appointment is a whole-time one, of Consultant status, and will be subject to the terms and conditions of service of hospital medical and dental staffs. The provisions of the National Health Service (Superannuation) Regulations, 1950, are also applicable. In accordance with declared policy the Regional Blood Transfusion Service will have close associations with the University School of Medicine and the Board will not object to the successful candidate accepting, if offered, an honorary University appointment.

Applications, stating age, qualifications, and details of experience, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, by not later than 17th February, 1951. Canvassing in any form, either directly or indirectly, will disqualify.

LUTON CHEST CLINIC, Grove-road, Luton. North West METROPOLITAN REGIONAL HOSPITAL BOARD invite applications from physicians with good general medical experience and special experience in the treatment of chest diseases and tuberculosis for whole-time appointment of PHYSICIAN. Duties would include supervision of the work at 2 subsidiary clinics at Letchworth and Hitchin. So far as the chest clinic duties are concerned, the appointment will be the joint responsibility of the Regional Hospital Board and the Bedfordshire County Council. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Clinic by direct appointment.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications from suitably qualified and experienced practitioners for the 2 following whole-time, non-resident posts of ASSISTANT RADIOLOGIST at :—

(*a*) Burnley and District (Victoria, Burnley General, Reedyford, &c.) Hospitals.

(*b*) Bury and Rochdale (Bury General, Rossendale, Rochdale Infirmary and Birch Hill, &c.) Hospitals.

Applicants must hold the D.M.R.(D) and have had wide experience in diagnostic radiology. The successful candidates will work under the supervision of Consultants and will be required to live within a reasonable distance of Burnley or Bury and Rochdale. Salary £1300 (at age 32)–£50–£1750. National terms and conditions of service applicable and the posts superannuable. Applicants for both posts should state their preference, if any.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, together with the names and addresses of 3 referees, to be received not later than 12th February, 1951. Canvassing will disqualify.

LIVERPOOL REGIONAL HOSPITAL BOARD invite applicants for the Consultant post of PATHOLOGIST. The appointment will be whole-time and the successful candidate will be responsible for the pathological work in the Warrington group of hospitals and the Winwick Mental Hospital. His main duties will be centred on Warrington Infirmary and Warrington General Hospital.

Forms of application obtained from, and should be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 10th February, 1951.

VINCENT COLLINGE, Secretary to the Board.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of Part-time PHYSICIAN at the above Hospital for 3 half-days per week. This is a general hospital of about 550 Beds, with the usual special departments, and is an important centre for radiotherapy. Applicants should possess a higher medical qualification and have had wide experience in general medicine. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Secretary of the Hospital.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of Part-time GYNÆCOLOGIST at the above Hospital for 1 half-day per week. This is a general hospital of about 550 Beds, with the usual special departments, and is an important centre for radiotherapy. Applicants should possess a higher surgical qualification and have had wide experience in this specialty. Experience in radium as applied to gynæcology would be an advantage. The terms and conditions of service for hospital medical and dental staffs (Consultants) will apply to the post.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Secretary of the Hospital.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for an appointment as CONSULTANT VENEREOLOGIST at the following groups of hospitals :—

(i) Dartford.
(ii) Medway and Gravesend.
(iii) Mid-Kent.

Candidates must have had wide experience in venereology and possession of a higher qualification is desirable. Choice of whole-time employment or the maximum number of part-time notional half-days will be offered. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment, and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day of acceptance of applications will be 9th February, 1951, and selected candidates will be interviewed in London on 9th March, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the hospitals concerned.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for an appointment as CONSULTANT DERMATOLOGIST at the following groups of hospitals :—

(i) Dartford.
(ii) Medway and Gravesend.
(iii) Mid-Kent.
(iv) Sidcup and Swanley.

Candidates must have had wide experience in dermatology and possession of a higher qualication is desirable. Choice of whole-time employment or the maximum number of part-time notional half-days will be offered. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day of acceptance of applications will be 9th February, 1951, and selected candidates will be interviewed in London on 9th March, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the hospitals concerned.

ST. ALBANS, HERTS. HILL END HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the appointment of ASSISTANT PSYCHIATRIST in the Hill End Hospital Psychiatric and Child Guidance Service, for 3 sessions weekly, one being at a branch clinic in the County of Herts. Candidates should possess the D.P.M. and have had training and experience in child guidance and adult psychotherapy. The terms and conditions of service for hospital medical and dental staffs will apply to the post and salary will be on the scale of £1300–£1750 p.a.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Hospital by direct appointment with the Secretary of the Hospital.

ST. ALBANS CHEST CLINIC, St. Albans City Hospital (OSTERHILLS UNIT), ST. ALBANS, HERTS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD invite applications for the whole-time appointment of ASSISTANT PHYSICIAN at the above Clinic. Candidates should possess a higher medical qualification and have good general medical experience and special experience in the treatment of chest diseases and tuberculosis. The successful applicant will work under the general supervision of the Consultant Physician in charge and duties will be in the modern well-equipped clinic and in the wards of 34 Beds for tuberculosis at the City Hospital. The Clinic is also associated with Clare Hall Hospital (approximately 530 Beds for the treatment of tuberculosis). The terms and conditions of service for hospital medical and dental staffs will apply to the post and salary will be on the scale of £1300–£1750 p.a.

Applications, stating date of birth, qualifications, and experience, with the names of 3 referees, should reach the Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, not later than 10th February, 1951. Canvassing will disqualify, but candidates are invited to visit the Clinic by direct appointment.

OXFORD REGIONAL HOSPITAL BOARD invite applications for the post of ACCIDENT AND ORTHOPÆDIC SURGEON at the hospitals of Reading Hospital Management Committee. The post will be part-time for 8 notional half-days a week and will carry Consultant status. Applicants must be Fellows of a Royal College of Surgeons or hold a Mastership in Surgery ; the successful candidate will be a member of a team and be required to live in or near Reading.

Applications, stating age, qualifications, experience, and the names of 3 referees, should reach the Secretary of the Board (from whom further particulars can be obtained) by 17th February.

SHEFFIELD REGIONAL HOSPITAL BOARD invite applications from qualified medical practitioners for the following maximum part-time post :—

CONSULTANT E.N.T. SURGEON to the Chesterfield Royal Hospital and the United Sheffield Hospitals (Royal Infirmary Unit) as arranged with the Board of Governors of the United Sheffield Hospitals, with duties also at the Lodge Moor Isolation Hospital, Sheffield, and certain school clinics.

The salary and conditions of service will be in accordance with those agreed between the Ministry of Health and the profession. The post is subject to the National Health Service (Superannuation) Regulations, 1950.

Application forms and full details may be obtained from the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms must be received not later than 5th February, 1951. Canvassing will disqualify, but candidates are invited to visit the hospitals and clinics concerned by direct arrangement.

SHEFFIELD REGIONAL HOSPITAL BOARD invite applications from registered medical practitioners for the post of Whole-time CONSULTANT RADIOLOGIST with duties at the Doncaster Royal Infirmary ; the Victoria and Kilton Hospitals, Worksop ; Fullerton Hospital, Denaby Main ; the Retford and District Hospital ; and the Rampton Hospital. The person appointed will be required to reside within 10 miles of the Doncaster Royal Infirmary. The salary and conditions of service will be in accordance with those agreed by the Ministry of Health and the profession. The post is subject to the National Health Service (Superannuation) Regulations, 1950.

Application forms and full details may be obtained from the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms must be received not later than 5th February, 1951. Canvassing will disqualify, but candidates are invited to visit the hospitals concerned by direct arrangement.

TONBRIDGE, KENT. MABLEDON PARK HOSPITAL. SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. DARENTH AND STONE GROUP OF HOSPITALS. Applications are invited from Psychiatrists for 2 vacancies at above Hospital, a unit of 120 Beds for the treatment of neurosis and early psychosis in Polish-speaking people :—

(i) CONSULTANT PSYCHIATRIST to act as Physician Superintendent.
(ii) PSYCHIATRIST. Salary £1300–£50–£1750 p.a.

Applicants must have had wide experience in psychiatry, a higher qualification being desirable. Practical professional experience combined with knowledge of Polish-speaking people is essential. The appointments will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Apply, stating nationality, age, sex, qualifications, and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1. The last day for acceptance of applications will be 9th February, 1951, and selected candidates will be interviewed in London on 1st March, 1951. Canvassing of members of the Board or the Advisory Appointments Committee will disqualify, but applicants may visit the Hospital.

NEW ZEALAND. AUCKLAND HOSPITAL BOARD. Applications are invited from suitably qualified medical practitioners, preferably with a higher qualification, for the positions of ASSISTANT E.N.T. SURGEONS, Part-time Visiting Medical Staff, for the period ending 31st March, 1952. The vacancies exist at the Auckland and Green Lane Hospitals, and appointees are required to take up their duties as soon as possible. Salary £300 p.a. Memorandum relating to the positions and forms of application may be obtained from the office of the High Commissioner for New Zealand, 415, Strand, London, W.C.2.

Applications close with the undersigned at the Office of the Board, Kitchener Street, Auckland, New Zealand, at NOON on Monday ,5th March, 1951. R. F. GALBRAITH, Secretary.

WELSH REGIONAL HOSPITAL BOARD invite applications for the whole-time appointment of ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at the Cefn Coed Hospital, Swansea. The Hospital provides all modern methods of treatment and has associated adult psychiatric outpatient clinics and accommodates approximately 608 patients. Terms and conditions of service will be those announced by the Ministry of Health. Unfurnished quarters are available and if required an appropriate deduction from salary would be made. Candidates should hold the D.P.M. and have had a wide experience in psychiatry.

Applications, stating date of birth, giving a summary of qualifications, experience, and publications, with names of 3 referees, should be addressed to Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement. Canvassing will disqualify, but this does not prevent candidates from visiting the Hospital.

Hospital Services : Junior Appointments

ALBERT DOCK HOSPITAL (Orthopædic and Fractures). There will be a vacancy for RECEIVING ROOM OFFICER on 28th February. Candidates should have held House Officer appointments. Salary £670 p.a., less £150 p.a. for board, residence, and services. 6 months' appointment, with possible renewal up to 1 year.

Applications, stating age, qualifications, experience, nationality, with copies of recent testimonials, as soon as possible to—

F. A. LYON, Secretary of the Seamen's Hospitals Management Committee.

Dreadnought Hospital, Greenwich, S.E.10.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. BATTERSEA AND PUTNEY GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN required for 6 months from 7th February, 1951. Salary, &c., in accordance with national scale.

Applications, stating age, nationality, qualifications, and experience, with copies of 2 recent testimonials, to the Administrative Officer.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER in the Surgical Department. Appointment for 6 months from 19th February, 1951. Salary, terms, and conditions of service as issued by Ministry of Health.

Applications to Medical Director by 3rd February, 1951.

CHARING CROSS HOSPITAL. Junior House Surgeon required for service at Harrow Hospital (123 Beds) on 10th March, 1951. Resident post for 6 months with salary in accordance with Ministry of Health conditions of service. Salary £350 p.a. for first post, less £100 in respect of board, lodging, and other services.

Applications, with the names of 3 referees, should be sent to G. J. JONES Secretary to the Board of Governors, Harrow Hospital, Roxeth-hill, Harrow, Middlesex (Telephone: BYRon 2232).

EVELINA HOSPITAL FOR SICK CHILDREN, Southwark Bridge-road, London, S.E.1. (An Associate Hospital of Guy's Hospital.) Required, HOUSE SURGEON (second or third post), vacant on the 1st March, 1951. The duty for the first 2 months will be in the Casualty Outpatients' Department. The post is tenable for a period of 6 months. Salary at the rate of £400 or £450 a year, according to experience, with a deduction at rate of £100 a year for residential emoluments.

Applications, stating age, nationality, qualifications, with dates, and accompanied by copies of 3 recent testimonials, should reach the undersigned by the first post, Thursday, 8th February, 1951. W. H. SIDNELL, House Governor.

HACKNEY HOSPITAL, E.9. Applications invited for appointment of HOUSE SURGEON to E.N.T. Department (with casualty duties). 6 months' appointment. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs. A deduction at the rate of £100 p.a. will be made for residential emoluments.

Applications, together with copies of 3 testimonials, should be sent as soon as possible to the Secretary, Hackney Group (No. 6) Hospital Management Committee, Hackney Hospital, E.9.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. ROYAL FREE GROUP. Required, CASUALTY OFFICER (resident), Male or Female. Salary £400 or £450 p.a., according to experience, plus £50 p.a. as a supplemental payment, post vacant 1st April, tenable for 6 months at the Main Outpatient Department, Camden Town, N.W.1.

Applications must be made on the prescribed form, with copies of 3 recent testimonials, to be returned by 2nd February.

K. A. F. MILES, House Governor.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. ROYAL FREE GROUP. Required, RESIDENT HOUSE SURGEON (Male or Female), for a period of 6 months. The successful candidate will be required to take up his duties on 18th March. Salary in accordance with the new national scale.

Applications on the prescribed form, with copies of 3 recent testimonials, to be returned by 2nd February.

K. A. F. MILES, House Governor.

HOSPITAL FOR WOMEN, Soho-square, W.1. (Affiliated to the Middlesex Hospital.) Applications invited for a full-time post of RESIDENT SENIOR HOUSE OFFICER vacant on 1st April, 1951. Appointment is for 6 months. Salary in accordance with the terms laid down for medical and dental staffs, less a deduction at rate of £100 p.a. for residential emoluments.

Applications, stating age, nationality, qualifications, and experience, supported by the names and addresses of 3 referees, must reach the undersigned not later than 10th February.

D. C. EMERY, Secretary.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th March, 1951, for 2 SURGICAL REGISTRARS (part-time) to attend in the Outpatient and Casualty Departments as follows :—

Monday morning (Outpatient Department, 1 session).
Tuesday morning (Outpatient Department, 1 session).
Tuesday afternoon (Casualty Department, 1 session).
Wednesday morning (Casualty Department, 1 session).
Thursday morning (Outpatient Department, 1 session).
Thursday morning (Casualty Department, 1 session).
Thursday afternoon (Casualty Department, 1 session).
Friday morning (Casualty Department, 1 session).
Saturday morning (Outpatient Department, 1 session).

The appointments are graded as Senior Registrarships within the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Further particulars and form of application, which must be returned not later than 12th February, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th April, 1951, for the following :—

3 HOUSE PHYSICIANS.
HOUSE SURGEON to the Orthopædic and Plastic Departments.

The posts, which are resident and tenable for 6 months, are graded as Senior House Officers in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), the salary being at the rate of £670 p.a.

Further particulars and form of application, which must be returned not later than 5th March, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 9th April, 1951, for an ASSISTANT RESIDENT MEDICAL OFFICER at the Country Branch Hospital, Tadworth, Surrey (101 Beds). The post, which is tenable for 6 months, is graded as that of Senior House Officer in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), the salary being at the rate of £670 p.a.

Further particulars and form of application, which must be returned not later than Monday, 5th March, 1951, are obtainable from H. F. RUTHERFORD, House Governor and Secretary.

KING EDWARD MEMORIAL HOSPITAL, Ealing. HOUSE OFFICER (second or third post) to Casualty and Fracture Departments. Salary, terms, and conditions as approved for hospital medical staff.

Applications, stating age, nationality, qualifications with dates, and details of experience, together with copies of 2 recent testimonials, should be sent to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, as soon as possible.

KING EDWARD MEMORIAL HOSPITAL, Ealing, W.13. HOUSE PHYSICIAN (second or third post), vacant 1st March, 1951. Salary, terms, and conditions as approved for hospital medical staff.

Applications, stating age, nationality, qualifications with dates, and details of experience, together with copies of 2 recent testimonials, should be sent to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, by 7th February, 1951.

LONDON HOSPITAL, Whitechapel, E.1. Applications invited for post of REGISTRAR to the Venereal Diseases Department Laboratory, vacant on 1st April, 1951. Knowledge of serology desirable. Duties include work in the clinical laboratories of the hospital. The appointment will be for 1 year, renewable for a further year at a salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications (6 copies), giving names and addresses of 3 referees, should be addressed to the House Governor (from whom further particulars may be obtained) by 8th February, 1951.

H. BRIERLEY, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications invited for post of SENIOR REGISTRAR in General Medicine, vacant on 1st April, 1951. Candidates should be Members of the Royal College of Physicians, London. The appointment will be for 1 year, renewable for a further year at a salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications (12 copies), giving the names and addresses of 3 referees, should be addressed to the House Governor (from whom further particulars may be obtained), by 26th February, 1951. H. BRIERLEY, House Governor.

MOTHERS' HOSPITAL (Salvation Army), Clapton, E.5. (Maternity—110 Beds.) Applications invited from registered medical Women practitioners for 2 appointments of RESIDENT OBSTETRIC HOUSE SURGEONS (second or third House Officer posts), recognised for M.R.C.O.G. Candidates should have held responsible surgical or medical posts and have had some obstetric experience. The appointments are for a period of 6 months, from 1st March, 1951, at salaries, and on conditions of service, as approved by the Minister of Health.

Applications, giving age, nationality, qualifications, and experience, with copies of 3 testimonials, should be submitted immediately to the Secretary, Hackney Group (No. 6) Hospital Management Committee, 230, Homerton High-street, E.9.

MIDDLESEX HOSPITAL, W.1. Applications invited for post of MEDICAL REGISTRAR. The appointment is non-resident and until 31st December, 1951, in the first instance, with salary at the rate of £775 p.a.

Forms of application are obtainable from the Deputy Superintendent and should be submitted, with copies of testimonials, by 10th February.

MILE END HOSPITAL, Bancroft-road, London, E.1. (455 Beds.) Required, HOUSE SURGEON (House Officer, first, second, or third post), post vacant immediately. Tenable for 6 months. Salary, &c., in accordance with national scale.

Application forms obtainable from the Secretary, Stepney Group Hospital Management Committee, Raine-street, Wapping, E.1.

POPLAR HOSPITAL, East India Dock-road, London, E.14. (120 Beds.) Required, HOUSE SURGEON (first, second, or third post). Duties include inpatient, outpatient, and casualty work. Salary in accordance with terms of service issued by the Ministry of Health.

Applications, stating age, nationality, and qualifications, to be submitted to the Assistant Secretary as soon as possible.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. Required, RESIDENT SENIOR HOUSE OFFICER in the Pædiatric Department. Duties will include supervision of the babies, research work under the direction of the visiting staff, and charge of Follow-up Infant Clinics. Applicants must be registered medical practitioners. Previous experience at a Children's Hospital is essential and possession of a higher qualification is desirable. The appointment is tenable for 6 months from 1st April, 1951, in the first instance. Salary £670 p.a. less a deduction of £130 p.a. for board and lodging.

Applications must be lodged with the undersigned by 17th February, 1951, on forms to be obtained from R. S. H. THOMAS, Secretary, 339, Goldhawk-road, W.6.

ROYAL FREE HOSPITAL, Gray's Inn-road, W.C.1. Applications invited from registered medical practitioners for appointment of SIXTH HOUSE SURGEON to the Orthopædic Department. The appointment will commence as soon as possible, and continue until 30th June, 1951. Salary and conditions of service in accordance with those laid down by the Ministry of Health for House Officers.

Application forms may be obtained from the House Governor at the above address, and should be returned as soon as possible.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications invited from registered Women medical practitioners for appointment of RESIDENT MEDICAL OFFICER at the Hospital's 50-Bed country branch, near Crawley, Sussex ; the post becomes vacant on 1st February 1951. The post is of Senior House Officer (formerly Junior Registrar) status, and the appointment will be for a period of 1 year. Salary £670 p.a., less £150 p.a. for board, residence, &c.

For form of application apply to the Senior Administrative Assistant at the Hospital.

ST. CLEMENT'S HOSPITAL, London, E.3. Applications invited for post of SENIOR HOUSE OFFICER at above Hospital for duty in the Observation Wards and Psychiatric Unit, which is being reorganised. The post offers experience in the full range of acute psychiatric disorders and the hospital is recognised for the D.P.M. Salary £670 p.a.

Applications, stating age, and experience, together with testimonials, should be sent immediately to the Secretary, Bow Group Hospital Management Committee, Committee Offices, 2A, Bow-road, E.3.

ST. MARK'S HOSPITAL FOR DISEASES OF THE RECTUM AND COLON. THE BOARD OF GOVERNORS, THE HAMMERSMITH, WEST LONDON AND ST. MARK'S HOSPITALS, invite applications for the post of SENIOR SURGICAL REGISTRAR (resident) at above Hospital for an initial period of 6 months, commencing 1st April, 1951. Applicants must possess a higher surgical qualification. Salary in accordance with terms of service issued by the Ministry of Health.

Applications, stating age, qualifications with dates, and previous appointments held, together with names of 3 referees, should be forwarded to the undersigned not later than 3rd February, 1951.

150, Ducane-road, W.12. WM. MILTON, Secretary.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. A vacancy will occur on the 1st April, 1951, for a RESIDENT DENTAL HOUSE SURGEON holding a registrable dental qualification with, if possible, an additional qualification. The appointment will be for a minimum of 6 months during which time the successful candidate will be able to gain experience of all kinds of dental and oral surgery. This appointment is recognised by the Royal College of Surgeons for purposes of the Fellowship in Dental Surgery. Salary will be in accordance with the Ministry of Health's scale for House Officers.

Applications should be submitted to the undersigned not later than the 14th February, 1951.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. THOMAS'S HOSPITAL, London, S.E.1. Applications invited for post of SENIOR REGISTRAR in the Cardiac Department for a period of 1 year in the first instance. Terms and conditions of service of hospital medical and dental staffs will apply.

Applications (12 copies), stating age, qualifications with dates, details of experience, and the names and addresses of 3 referees to whom the Hospital may write, should be received by the Clerk of the Governors by 10th February, 1951.

ST. THOMAS'S HOSPITAL, London, S.E.1. Applications invited from registered medical practitioners for the post of a Part-time (6 sessions) or Whole-time SENIOR REGISTRAR in the Department of Thoracic Medicine for 1 year in the first instance. Terms and conditions of service of hospital medical and dental staffs will apply.

Applications (12 copies), stating age, qualifications with dates, and details of experience, with the names and addresses of 3 referees to whom the Hospital may write, should be received by the Clerk of the Governors not later than 9th February, 1951.

ST. STEPHEN'S HOSPITAL, Fulham-road, S.W.10. HOUSE PHYSICIAN (resident) to Pædiatric Department. Salary £450 p.a.

Applications, giving names of 2 personal referees, to Medical Superintendent as soon as possible.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of GENERAL MEDICAL OUTPATIENT REGISTRAR (part-time). Preference will be given to candidates who are Members of the Royal College of Physicians, or hold a Doctorate in Medicine of a university in the British Empire. The successful candidate will normally be required to undertake 4 notional half-days weekly. The appointment is for a first period of 12 months and the grading of the post will be Registrar.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, together with the names and addresses of 3 referees, should reach the undersigned by 3rd February, 1951.

8th January, 1951. ALAN POWDITCH, House Governor.

ST. MARY'S HOSPITAL, London, W.2. Applications invited for post of GENERAL SURGICAL OUTPATIENT REGISTRAR (part-time). Preference will be given to candidates who are Fellows of the Royal College of Surgeons of England. The successful candidate will normally be required to undertake 3 notional half-days weekly. The appointment is for a first period of 12 months and the grading of the post will be Registrar.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, together with the names and addresses of 3 referees, should reach the undersigned by 3rd February, 1951.

8th January, 1951. ALAN POWDITCH, House Governor.

ST. MARY'S HOSPITAL, London, W.2. Ophthalmic DEPARTMENT. WESTERN OPHTHALMIC HOSPITAL. (43 Beds.) Applications are invited for the post of NON-RESIDENT REGISTRAR at the Western Ophthalmic Hospital. Candidates must be registered medical practitioners, with postgraduate experience, and must hold, or be studying for, the F.R.C.S. The appointment is for a first period of 12 months, as from 1st March, 1951, the holder to be eligible for reappointment for 2 further periods of 12 months. The grading for this post is Senior Registrar and salary will be in accordance with that laid down in the terms and conditions of service of hospital medical and dental staffs. The duties will include clinical work, operative surgery, and emergencies.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous appointments, and experience, together with the names and addresses of 3 referees, should reach the undersigned by 10th February, 1951.

ALAN POWDITCH, Secretary to the Board of Governors.

15th January, 1951.

WHIPPS CROSS HOSPITAL. Hospital Management COMMITTEE. LEYTONSTONE GROUP. Applications invited for the positions of HOUSE PHYSICIANS (first, second, or third posts), at above Hospital, one of which will fall due on the 11th March, and the other on the 24th March, 1951. Salary and conditions of service in accordance with those decided by the Ministry of Health.

Applications, stating age, qualifications, and experience, together with the names of 3 referees, to the Medical Superintendent, Whipps Cross Hospital, Whipps Cross-road, Leytonstone, E.11, by 5th February, 1951.

Provincial

ALTRINCHAM GENERAL HOSPITAL, near Manchester. (130 Beds.) JUNIOR HOUSE OFFICER required to commence duties on or about 15th February, 1951. 6 months' appointment. Appropriate Ministry of Health salary scale according to experience, less £100 p.a. for emoluments. R practitioners within 3 months of qualification, or holding first posts, may apply.

Applications, stating age, qualifications, &c., should be addressed to Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ALTRINCHAM GENERAL HOSPITAL, near Manchester. (130 Beds.) SENIOR HOUSE OFFICER (resident) required to commence duties on or about 1st March, 1951. 12 months' appointment. Salary £670 p.a., less a deduction of £155 for residential emoluments. Post recognised for the F.R.C.S. qualification. This resident surgical appointment in a busy general hospital, staffed by Manchester Consultant Surgeons, offers excellent opportunities of practica lsurgical experience to suitably qualified candidates.

Applications, stating qualifications, previous hospital experience, age, nationality, names and addresses of 3 referees, should be forwarded to the Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

BATLEY. THE GENERAL HOSPITAL. (102 Beds.) Required, HOUSE OFFICER (Physician), post now vacant at the above General Hospital. Salary, &c., in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, with copies of 3 recent testimonials, should be addressed to the undersigned at 20, Oxford-road, Dewsbury.

GEO. W. BATCHELOR, Secretary, Dewsbury, Batley and Mirfield Hospital Management Committee.

AYLESBURY, BUCKS. TINDAL GENERAL HOSPITAL. RESIDENT SURGICAL OFFICER (Junior Registrar), Male. Salary £670 p.a., less a charge for residential emoluments. The Hospital consists of 282 Beds, of which 100 Beds are for general surgical cases. There are four other Resident Medical Officers. The post, which will be vacant at the end of February or early March, offers excellent general surgical experience and will be for 1 year in the first instance. It is eminently suitable for training in practical surgery and for the final Fellowship Examination.

Applications, with copies of 2 testimonials or names for reference, stating date free to commence duties, should be forwarded to the Administrative Officer.

AYLESBURY. TINDAL GENERAL HOSPITAL. (297 Beds.) HOUSE SURGEON (first or second post), vacant 15th February, 1951. This post offers good surgical experience and is recognised for the F.R.C.S.

Please apply, with 2 testimonials or names for reference, to the Administrative Officer.

BARNET GENERAL HOSPITAL, Barnet, Herts. House SURGEON (first or subsequent posts), required for 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. in respect of residential emoluments. Conditions of service in accordance with National Health Service regulations.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, should be sent immediately to the Medical Director.

BARNSTAPLE. NORTH DEVON INFIRMARY. (110 Beds.) HOUSE SURGEON required. Salary £350 p.a., less £100 p.a. for residential emoluments.

Applications to be sent to the Secretary and Finance Officer, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BATH. ST. MARTIN'S HOSPITAL. Required, 2 House PHYSICIANS. Salary and terms and conditions of service in accordance with those laid down by the Ministry of Health.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be received by undersigned as soon as possible.

J. LAWRENCE MEARS, Secretary,
Bath Hospital Management Committee.

Manor Hospital, Bath.

BURY GENERAL HOSPITAL. (164 Beds.) Required, HOUSE SURGEON. Post recognised for the F.R.C.S. Hospital is mainly surgical and experience can be gained in orthopædic and E.N.T. work. Salary and conditions of service in accordance with national scale.

Applications, giving full details of qualifications and experience, should be made immediately to—

H. WILKINSON, Secretary,
Bury and Rossendale Hospital Management Committee.

Bury General Hospital, Bury, Lancs.

BEDFORD GENERAL HOSPITAL. (426 Beds.) Resident HOUSE PHYSICIANS required for general medical duties: 1 to be resident at the North Wing (vacant on the 18th February, 1951), and 1 at the South Wing (vacant on the 14th February, 1951). Salary within the range of £350–£450 p.a., less £100 p.a. for residential emoluments.

Applications, stating age, nationality, qualifications, previous appointments, and the names of 3 persons to whom reference may be made if desired, should be addressed to the Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM ACCIDENT HOSPITAL, Birmingham, 15. (209 Beds.) GROUP 25 BIRMINGHAM (SELLY OAK) HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON (Male or Female). The appointment will be for a period of 6 months, of which the first 2 will be with the Burns Unit (Medical Research Council) and the remainder in general traumatic service. The Hospital treats 50,000 new patients each year. The post offers practical experience in the treatment of all types of injury and includes a course of instruction on accident surgery given by the Consultant staff. Salary in accordance with the national terms and conditions of hospital medical and dental staffs.

Detailed applications, accompanied by copies of recent testimonials, to be sent to the Administrator.

BIRMINGHAM. CANWELL HALL BABIES' HOSPITAL, near SUTTON COLDFIELD. (60 Cots—2 House Physicians.) GROUP 25 BIRMINGHAM (SELLY OAK) HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (second or third post), vacant on 1st March, 1951. 6 months' appointment. Recognised for the D.C.H. Salary according to national scale. Arrangements are made to attend at other hospitals, including Neonatal Departments.

Applications should be sent to the Pædiatrician, Sorrento Maternity Hospital, Birmingham, 13, not later than 6th February, 1951.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited for following appointments :—

(*a*) RESIDENT SURGICAL REGISTRAR, Coventry and Warwickshire Hospital, Coventry ; main hospital of group undertaking all major and minor surgery. Applicants should possess higher surgical qualification and previous experience in surgical posts.

(*b*) Whole-time SENIOR E.N.T. REGISTRAR, Shrewsbury group ; Eye, Ear, and Throat Hospital (70 Beds). Copthorne Hospital (160 Beds). Candidates should possess higher surgical qualification.

(*c*) Whole-time SENIOR REGISTRAR in Ophthalmology, Stoke-on-Trent group ; duties mainly North Staffordshire Royal Infirmary (515 Beds). Candidates should possess higher qualification.

(*d*) Whole-time REGISTRAR in Psychiatry, Birmingham (Mental E) group ; duties at Coleshill Hall, Warwickshire (mental defective colony ; both sexes, all ages, 457 Beds), Marston Green Home, Birmingham (677 Beds) and Weston Colony, Leamington Spa (225 Beds). Candidates should possess D.P.M.

(*e*) Whole-time REGISTRAR in General Medicine, Coventry group ; duties mainly Coventry and Warwickshire Hospital (346 Beds). Candidates should possess higher medical qualification.

Candidates for all appointments should have considerable experience in specialty concerned. Appointments in accordance with terms and conditions of service and subject to National Health Service superannuation regulations.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, before 12th February, 1951. Canvassing will disqualify. Candidates may visit group hospital.

BIRMINGHAM (DUDLEY ROAD) GROUP OF HOS-PITALS MANAGEMENT COMMITTEE invite applications from registered medical practitioners for the following positions in the Department of Pathology :—

SENIOR HOUSE OFFICER. Salary £670 p.a.

LOCUM TENENS (Junior Hospital Medical Officer grade). Salary £700–£50–£1000 p.a.

Applications, giving details of qualifications, and experience, together with the names of 2 referees, should be forwarded to—

J. PRESTON, Secretary to the Group.
Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. The BIRMINGHAM (DUDLEY ROAD) GROUP OF HOSPITALS. Applications invited for post of HOUSE SURGEON in the Ear and Throat Department at Dudley Road Hospital, vacant at the beginning of March next. This Hospital is recognised for training for the D.L.O. The appointment will be made in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, nationality, and experience, and accompanied by copies of 3 recent testimonials, should be forwarded to the undersigned within 7 days from the appearance of this advertisement.

J. PRESTON, Secretary,
Hospital Management Committee.
Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. The BIRMINGHAM (DUDLEY ROAD) GROUP OF HOSPITALS. Applications invited from registered medical practitioners, Male or Female, for appointment as HOUSE PHYSICIAN at Dudley Road Hospital (900 Beds). Post vacant at the beginning of March next. The appointment will be made in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, nationality, and experience, and accompanied by copies of 3 recent testimonials, should be sent to the undersigned within 7 days from the appearance of this advertisement.

J. PRESTON, Secretary,
Hospital Management Committee.
Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM. SORRENTO AND LORDSWOOD MATERNITY HOSPITALS. GROUP 25 BIRMINGHAM (SELLY OAK) HOSPITAL MANAGEMENT COMMITTEE. OBSTETRIC HOUSE SURGEON (second or third post). 9 months' appointment—6 months at Sorrento followed by 3 months at Lordswood Maternity Hospital. Recognised for the D.Obst.R.C.O.G. Salary according to national scale.

Applications for the above appointment, which becomes vacant on 1st March, should be sent to the Obstetrician, Sorrento Maternity Hospital, Birmingham, 13, not later than 31st January, 1951.

BIRMINGHAM. THE CHILDREN'S HOSPITAL. The UNITED BIRMINGHAM HOSPITALS. Applications are invited from registered medical practitioners, Male or Female, for the following Resident House Officer posts :—

ASSISTANT CASUALTY OFFICER,
HOUSE PHYSICIAN,

vacant 1st April for 6 months. Salary in accordance with terms and conditions of service for hospital medical staff, less £100 p.a. for board-residence.

Forms of application may be obtained from the undersigned and should be returned not later than 10th February, 1951.

N. R. WINWOOD, House Governor.
Ladywood-road, Birmingham, 16.

BIRMINGHAM, 18. WINSON GREEN HOSPITAL. BIRMINGHAM (MENTAL A) GROUP NO. 5 HOSPITAL MANAGEMENT COMMITTEE. Applications invited for post of SENIOR HOUSE OFFICER (Male or Female). Salary at rate of £670 p.a., less a charge of £120 p.a. for board and lodging if resident. The post, which will be for 1 year in the first instance, will be subject to the terms and conditions of service for medical and dental staffs and subject to the National Health Service superannuation regulations. The Hospital is associated with the University of Birmingham for the teaching of psychiatry, and training for the D.P.M. will be provided.

Applications, stating age and qualifications, to be sent to the Medical Superintendent at the Hospital.

BOLTON. THE HULTON HOSPITAL. (130 Beds.) Required, RESIDENT MEDICAL OFFICER, post vacant 1st March and tenable for 12 months. Duties principally in connection with infectious diseases and dermatology cases, and some relief duties with tuberculosis cases. Previous pædiatric experience is desirable. Salary £670 p.a., with conditions of service in accordance with the terms issued by the Ministry of Health. An appropriate charge will be made for residence.

Applications, stating age, nationality, qualifications, and experience, together with the names of 2 persons to whom reference may be made, to be sent to the undersigned at the Royal Infirmary, Bolton, as soon as possible.

H. P. TRAVIS, Secretary,
Bolton and District Hospital Management Committee.

BOLTON. THE ROYAL INFIRMARY. (235 Beds—Junior Medical Establishment of 10.) Required, RESIDENT HOUSE SURGEONS (2) for general surgical duties, one post vacant immediately and the other on 12th February. Appointments will be for 6 months with salary £350, £400, or £450 p.a., according to experience. Other conditions of service in accordance with the terms issued by the Ministry of Health. A charge of £100 p.a. will be made for residence.

Applications, stating age, nationality, qualifications, and experience, together with the names of 2 persons to whom reference may be made, to be sent to the undersigned at the Royal Infirmary, Bolton, as soon as possible.

H. P. TRAVIS, Secretary,
Bolton and District Hospital Management Committee.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON. Salary £350–£450 p.a., according to previous posts held, less £100 p.a. for full residential emoluments.

Applications, stating age, qualifications, and experience, together with copies of not more than 3 testimonials, should be sent to the Secretary, The General Hospital, Bishop Auckland, co. Durham, as soon as possible.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON, post vacant 24th February, 1951. Salary in accordance with National Health Service scale—£350–£450 p.a., with a deduction of £100 p.a. for full residential emoluments.

Applications, stating age, experience, nationality, and qualifications, with copies of 3 testimonials, to the Assistant Secretary of the above Hospital.

BRADFORD ROYAL INFIRMARY. House Surgeon (Thoracic Unit) required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary.

BRADFORD ROYAL INFIRMARY. Orthopædic and ACCIDENT HOUSE SURGEON required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, along with copy testimonials, to Secretary.

BRADFORD. ST. LUKE'S HOSPITAL. House Surgeon (orthopædic and accident) required. Salary £350–£450 p.a., according to experience, less £100 p.a. emoluments.

Applications, stating age, nationality, qualifications, and experience, along with copy testimonials, to Secretary, Royal Infirmary, Bradford.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (302 Beds.) BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required for the above Hospital, vacant early February, 1951. Salary £350–£450 a year, according to experience, less £100 in respect of residential emoluments.

Applications, with full details of experience, &c., and enclosing copies of 3 recent testimonials, should be sent to the Administrative Officer at the Hospital, as soon as possible.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment of a JUNIOR HOSPITAL MEDICAL OFFICER in Venereology (non-resident). The successful candidate will be attached to Frenchay Hospital and in addition will be required to undertake duties in the various Bristol area clinics. Previous experience in venereology an advantage. The appointment will be subject to the National Health Service superannuation regulations and terms and conditions for hospital medical staff. Salary scale £700–£50–£1000.

Applications, with full particulars of age, qualifications, and experience, and the names and addresses of 3 referees, should reach the Secretary, Frenchay Hospital, Bristol, not later than 31st January, 1951.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. COSSHAM MEMORIAL HOSPITAL. (101 Beds—General and Casualty.) Required, HOUSE SURGEON AND CASUALTY OFFICER (first post) required 1st March, 1951. National salary scale and conditions.

Applications, with full particulars, should be sent to the Group Secretary, Frenchay Hospital, Bristol.

BROMSGROVE. ALL SAINTS' HOSPITAL. (468 Beds.) MID-WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. Required, 2 HOUSE SURGEONS (resident) at the above Hospital. Post vacant now. Salary, terms, and conditions approved for hospital medical staff.

Applications, with copies of recent testimonials, to the Physician-Superintendent.

BROMSGROVE. HILL TOP HOSPITAL. (76 Beds.) Required :—

2 HOUSE SURGEONS (resident),
HOUSE PHYSICIAN (resident),

at the above Hospital shortly to be used as a Regional Thoracic Centre. Posts vacant now. Salaries, terms, and conditions of service in accordance with those laid down by the Ministry of Health for hospital medical staff.

Applications, stating age, qualifications, and experience, and quoting the names of 3 referees, should be sent to—

C. M. SMITH, Secretary,
Mid-Worcestershire Hospital Management Committee.
Birmingham-road, Bromsgrove.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.

Florence Nightingale Hospital, Bury (120 Beds for Infectious Diseases)

Aitken Sanatorium, Holcombe, near Bury (70 Beds for Tubercle)

A vacancy exists for a HOUSE PHYSICIAN to work between these Hospitals. Applicants should have held previous House Officer posts. Salary and conditions of service will be in accordance with those laid down for hospital medical and dental staffs.

Applications should be made immediately to—

H. WILKINSON, Secretary to the Committee.
Bury General Hospital, Walmersley-road, Bury, Lancs.

CHESTERFIELD ROYAL HOSPITAL. (327 Beds.) HOUSE PHYSICIAN required 1st March for 6 months' appointment. Salary in accordance with Ministry of Health rates.

Applications, with details of age, qualifications, and experience, and copies of 3 testimonials, to be submitted immediately to—

M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.
Royal Hospital, Chesterfield.

BROMLEY HOSPITAL. (215 Beds.) Casualty Officer required. The post is tenable for 6 months commencing 1st March, 1951. Salary £350 p.a., less £100 a year in respect of board, lodging, and other services provided.

Applications should be sent to the Administrative Officer, Bromley Hospital, Cromwell-avenue, Bromley, Kent, by 31st January, 1951.

CARDIFF. CITY ISOLATION HOSPITAL. (219 Beds.) HOUSE OFFICER (medical) required at the above Hospital. Salary £350, £400, or £450 a year, according to experience, less emoluments valued £100. The post is resident and tenable for 6 months.

Applications to the Secretary, Cardiff Hospital Management Committee, St. David's Hospital, Cardiff.

CARDIFF. ROYAL HAMADRYAD GENERAL AND SEAMEN'S HOSPITAL. (66 Beds.) HOUSE SURGEON required at the above Hospital. Salary £350, £400, or £450 a year, according to experience, less emoluments valued £100. The post is resident and tenable for 6 months.

Applications to the Secretary, Cardiff Hospital Management Committee, St. David's Hospital, Cardiff.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (240 Beds.) CANTERBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, ORTHOPÆDIC HOUSE SURGEON. Appointment now vacant and limited to 6 months. Previous experience in orthopædic surgery an advantage. Post is recognised for the F.R.C.S. Diploma. Salary £400 or £450 p.a., according to number of posts held, with a deduction of £100 p.a. for residential emoluments.

Applications, giving age, full particulars of qualifications with dates, and experience, with copies of 3 recent testimonials, should be forwarded as soon as possible to M. D. KAY, Chief Administrative Officer at the Hospital.

CHELMSFORD AND ESSEX AND ST. JOHN'S HOSPITALS. HOUSE SURGEON required to work at above Hospitals. Salary according to National Health Service scale.

Apply to Secretary, Hospital Management Committee—Chelmsford Group, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. 2 House SURGEONS required, 1 to commence immediately and 1 beginning of February. Salary according to National Health Service scale.

Apply, Secretary, Hospital Management Committee, Chelmsford Group, London-road, Chelmsford.

CHELTENHAM. SUNNYSIDE MATERNITY HOSPITAL. Required, RESIDENT OBSTETRIC OFFICER. The Hospital, which is recognised for the purpose of training for the D.Obst.R.C.O.G., has 63 Beds and deals with the majority of abnormal midwifery cases in North Gloucestershire. Appointment is for a period of 6 months and the salary will be £400 or £450 p.a., less £100 in respect of residential emoluments.

Applications, stating age, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Cheltenham Group Hospital Management Committee, General Hospital, Cheltenham.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. (205 Beds.) Applications invited from Male registered medical practitioners for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER. Salary and conditions of service in accordance with national agreement. The Hospital is for the active treatment of pulmonary tuberculosis and includes a Regional Major Thoracic Surgery Unit.

Applications, stating age, qualifications, and experience, together with names of 2 referees, should be sent immediately to the Secretary.

CLACTON AND DISTRICT HOSPITAL, Clacton-on-Sea, ESSEX. Required, HOUSE SURGEON (first, second, or third post). The appointment will be for a period of 6 months. Salary in accordance with the terms and conditions of service of hospital medical staff, with a deduction of £100 p.a. in respect of residential emoluments.

Applications, together with copies of 2 recent testimonials, should be sent as soon as possible to the Group Secretary, 14, Pope's-lane, Colchester.

COTTINGHAM, E. YORKS. CASTLE HILL HOSPITAL. (200 Beds—modern I.D. hospital with full laboratory facilities.) Whole-time HOUSE OFFICER (second or third post) required for duties under Consultant in I.D.

Detailed applications, with names of 3 referees, to be received by the Secretary, No. 5 Hospital Management Committee, Hull B Group, Castle Hill, Cottingham, E. Yorks, by 5th February, 1951.

COVENTRY GROUP NO. 20 HOSPITAL MANAGEMENT COMMITTEE. Applications invited for under-mentioned posts. National scale of salaries :—

Coventry and Warwickshire Hospital (346 Beds)
SENIOR HOUSE SURGEON (Junior Registrar grade) for Casualty and Orthopædic Department, post now vacant.

Manor Hospital, Nuneaton (137 Beds)
HOUSE SURGEON for Casualty Department and general duties.

Applications, stating age, nationality, qualifications, and experience, with copies of recent testimonials, to the Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Coventry.

DEWSBURY, BATLEY AND MIRFIELD HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR HOSPITAL MEDICAL OFFICER in the specialty of pædiatrics. The Staincliffe General Hospital, Dewsbury, is recognised for the D.C.H. Post is resident and subject to 1 month's notice on either side. Duties to be carried out at hospitals in the Group. Salary according to national scale.

Applications, stating age, qualifications, and nationality, with names of 2 referees, should be forwarded to the Secretary, Dewsbury, Batley and Mirfield Hospital Management Committee, 20, Oxford-road, Dewsbury.

DEWSBURY. STAINCLIFFE GENERAL HOSPITAL AND NORTH BIERLEY ANNEXE. (374 Beds.) Applications invited for post of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident) at the above Hospital, vacant on 1st March, 1951. Salary £700–£50–£1000 p.a. National Health Service superannuation regulations.

Applications, with recent testimonials, to be forwarded immediately to G. W. BATCHELOR, Secretary.

Hospital Management Committee No. 11,
20, Oxford-road, Dewsbury.

DEWSBURY. THE GENERAL HOSPITAL. House OFFICER (surgical), third or subsequent appointment, to assist Consultant Ophthalmic Surgeon. Terms and conditions of service as laid down for hospital medical and dental staffs (England and Wales).

Applications, giving full particulars and names of 3 referees, to undersigned at 20, Oxford-road, Dewsbury.

G. W. BATCHELOR, Secretary, Dewsbury, Batley and Mirfield Hospital Management Committee.

COLCHESTER, ESSEX. ESSEX COUNTY HOSPITAL. (192 Beds.) COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, CASUALTY OFFICER AND HOUSE SURGEON (first, second, or third post), to E.N.T. Department. Tenable for 6 months. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, should be forwarded to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester.

DRIFFIELD, YORKS. EAST RIDING GENERAL HOSPITAL. (304 Beds.) HOUSE PHYSICIAN (first, second, or third post) required. Dealing mainly with medical but also some anæsthetics and casualty work. Salary in accordance with the terms of service issued by the Ministry of Health.

Applications, stating age, qualifications, and experience, together with copies of 3 references, should be addressed to the Secretary, Westwood Hospital, Beverley, Yorks.

DRIFFIELD, YORKS. EAST RIDING GENERAL HOSPITAL. (304 Beds.) SENIOR HOUSE OFFICER (surgical) required. Salary £670 p.a., in accordance with the terms of service issued by the Ministry of Health.

Applications, stating age, qualifications, and experience, together with copies of 3 references, should be addressed to the Secretary, Westwood Hospital, Beverley, Yorks.

DUMFRIES. ROYAL INFIRMARY. Dumfries and GALLOWAY HOSPITAL BOARD. Required, RESIDENT HOUSE SURGEON for 6 months, commencing 1st April, 1951. Salary and conditions of service according to the National Health Service scale.

Applications, stating age, qualifications, experience, with names of 3 referees, should be sent to Group Medical Superintendent, Royal Infirmary, Dumfries.

DORCHESTER. DORSET COUNTY HOSPITAL. (125 Beds.) HOUSE SURGEON (Male or Female) required, post now vacant. Appropriate Ministry of Health salary according to experience, with a deduction of £100 p.a. for residence. Post tenable for 6 months.

Applications, stating age, experience, qualifications, and nationality, together with copies of testimonials, to be sent to the Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, immediately.

DONCASTER HOSPITAL MANAGEMENT COMMITTEE invite applications from registered medical practitioners for non-resident post of JUNIOR HOSPITAL MEDICAL OFFICER in Chest Clinics. Salary and conditions of service in accordance with terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, should be forwarded not later than 28th February, 1951, addressed to the Secretary, Doncaster Hospital Management Committee, c/o Doncaster Royal Infirmary, Doncaster.

DONCASTER ROYAL INFIRMARY. Applications invited from registered medical practitioners for the whole-time post of CASUALTY OFFICER at above Hospital in accordance with the terms and conditions of service for hospital medical and dental staffs. Salary at rate of £670 p.a., from which a deduction at rate of £130 p.a. will be made for residential emoluments.

Applications, stating age, education, qualifications, and details of present and previous appointments with dates, and giving names and addresses of 3 referees, should be forwarded to the undersigned immediately.

ARTHUR JONES, Secretary,
Doncaster Hospital Management Committee.
c/o Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds—recognised under the Regulations for the Examinations of the R.C.S.) Required, HOUSE SURGEON (Male or Female). Salary £350, £400, or £450 p.a., according to experience. A deduction at rate of £100 p.a. made for board, residence, &c.

Applications, stating age, qualifications with dates, nationality, and present post, with copies of 3 recent testimonials, should be forwarded to—

ARTHUR JONES, Secretary,
Doncaster Hospital Management Committee.
c/o Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (330 Beds.) Required, HOUSE PHYSICIAN (Male or Female). The post will be vacant in mid-March, 1951. Salary at the rate of £350, £400, or £450 p.a., according to experience. A deduction at rate of £100 p.a. will be made for board, residence, &c.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be forwarded to—

ARTHUR JONES, Secretary,
Doncaster Hospital Management Committee
c/o Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (Recognised under the regulations for the D.L.O. and D.O.M.S.) Applications invited from registered medical practitioners for whole-time post of SENIOR HOUSE OFFICER, E.N.T. Department, in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales). Salary at the rate of £670 p.a.

Applications, stating age, education, qualifications, and details of present and previous appointments with dates, together with copies of 3 testimonials, should be forwarded to reach the undersigned not later than 28th February, 1951.

ARTHUR JONES, Secretary,
Doncaster Hospital Management Committee.
c/o Doncaster Royal Infirmary.

DONCASTER ROYAL INFIRMARY. (Recognised under the regulations for the D.A.) Applications invited from registered medical practitioners with the necessary experience for the appointment of RESIDENT ANÆSTHETIST in the grade of Senior House Officer. Salary at the rate of £670 p.a., from which a deduction of £130 p.a. will be made for board-residence, &c.

Applications, stating age, education, qualifications, and details of present and previous appointments with dates, together with copies of 3 testimonials, should be forwarded immediately to—

ARTHUR JONES, Secretary,
Doncaster Hospital Management Committee.
c/o Doncaster Royal Infirmary.

DARLINGTON MEMORIAL HOSPITAL. (316 Beds.) E.N.T. DEPARTMENT. Required, SENIOR HOUSE OFFICER. Commencing salary £670 p.a. The Inpatient Department is shortly to move into a new Unit now under construction.

Applications, giving age, experience, qualifications, and with 2 names for reference, should be sent forthwith to—

G. W. BECKWITH, Secretary.

DARLINGTON MEMORIAL HOSPITAL. Applications invited from Male or Female practitioners with experience, for post of CASUALTY OFFICER (Junior Hospital Medical Officer), resident. Salary £700–£50–£1000 p.a. The post is tenable for 12 months and is renewable annually.

Apply, with references, stating age and experience, to—

G. W. BECKWITH, Secretary.

DUNDEE MENTAL HOSPITAL, Westgreen, Dundee. Applications invited for appointment of JUNIOR HOSPITAL MEDICAL OFFICER (resident). Salary is at the rate of £700 p.a., less a deduction for residential emoluments, while the appointment will be held for not more than 1 year in the first instance.

Applications, containing copies of recent testimonials, should be sent to the Physician-Superintendent.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN (second or third post) required 27th March, 1951, for general medical and pædiatric duties. 6 months' appointment. Salary and conditions as prescribed by the Ministry of Health. R practitioners holding first posts may apply.

Applications, stating age, nationality, qualifications, and experience, with the names of 2 referees, to the Medical Director of the Hospital by 8th February, 1951. Canvassing disqualifies.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. (515 Beds.) ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN (second or third post) required 19th March, 1951, for general medical duties. 6 months' appointment. Salary and conditions as prescribed by the Ministry of Health. R practitioners holding first posts may apply.

Applications, stating age, nationality, qualifications, and experience, with names of 2 referees, to the Medical Director of the Hospital by 20th February, 1951. Canvassing disqualifies.

EPSOM. ST. EBBA'S HOSPITAL, Hook-road, Epsom, SURREY. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ST. EBBA'S AND BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment of SENIOR REGISTRAR at above Hospital. The Hospital is principally concerned with the treatment of voluntary cases of good prognosis, has a high turnover of cases, uses all modern treatment methods, and has teaching linkages with three London training hospitals. For residents a charge of £3 3s. a week is made for full residential amenities.

Application forms may be obtained by sending a stamped addressed envelope to the Secretary, St. Ebba's and Belmont Group Hospital Management Committee, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms (5 copies) should be returned to him within 2 weeks of the appearance of this advertisement. Canvassing disqualifies, but candidates are not precluded from visiting the Hospital by appointment.

FALMOUTH AND DISTRICT HOSPITAL. (61 Beds—2 Residents.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN, post vacant 1st April. Salary and conditions of service in accordance with Ministry of Health regulations.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 2 recent testimonials, should be forwarded to the Administrative Assistant, Falmouth and District Hospital, Cornwall.

FALMOUTH AND DISTRICT HOSPITAL. (61 Beds—2 Residents.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON, post vacant 21st February, in an extremely active general hospital doing major surgery and with both Outpatient and Casualty Departments. Salary and conditions of service in accordance with Ministry of Health regulations.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 2 recent testimonials, should be sent to the Administrative Assistant, Falmouth and District Hospital, Cornwall.

FARNHAM HOSPITAL, Hale-road, Farnham, Surrey. SENIOR SURGICAL OFFICER for duties in wards and casualty. Appointment for 1 year. Salary £670 p.a.

Applications by letter, stating age, qualifications, experience, and present appointment, with 1–3 recent testimonials (copies), to the Medical Superintendent of the Hospital.

GRIMSBY HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from Officers with experience in Anæsthetics for the post of Locum ANÆSTHETIST. The appointment is for 1 month (February, 1951). Salary will be in the scale £700–£1000.

Apply, with the names of 2 persons for reference, to the Secretary, Grimsby Hospitals Management Committee, 13, Queen's-parade, Grimsby.

GRIMSBY. SCARTHO ROAD INFIRMARY. (218 Beds.) GRIMSBY HOSPITALS MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). The person appointed will have, under the charge of Visiting Consultants, care of 34 acute surgical beds, to attend: 5 operating sessions weekly and 2 outpatient sessions weekly and share in the routine ward duties.

Applications to Administrative Officer, Scartho Road Infirmary, Grimsby.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON, post vacant, 24th February, 1951. The appointment is for 6 months and remuneration is in accordance with the National Health Service terms and conditions of service.

Applications should be sent to the Administrative Officer, Grimsby General Hospital, Grimsby.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Required, RESIDENT GYNÆCOLOGICAL HOUSE SURGEON (Male or Female) for duties at the above Hospital and Scartho Road Infirmary, Grimsby. Post is vacant on the 24th February, 1951, and is for 6 months.

Apply immediately to Administrative Officer, Grimsby General Hospital, Grimsby.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. (170 Beds.) WEST HERTS GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (second or third post), vacant 14th February, 1951. Salary and conditions of service in accordance with the National Health Service terms.

Applications, stating age, and giving full details of qualifications and previous experience, and accompanied by copies of 2 recent testimonials, should be submitted to the Administrator at the Hospital as soon as possible.

HASTINGS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (including practitioners within 3 months of qualification and liable under the National Service Acts) for appointments at the following hospitals and for service within the Hastings group of hospitals.

Bexhill Hospital, Bexhill-on-Sea

HOUSE SURGEON, now vacant.

HOUSE SURGEON, vacant 14th February, 1951.

Buchanan Hospital, St. Leonards-on-Sea

HOUSE SURGEON, vacant 5th March, 1951, or earlier, for duties primarily in connection with male urology and children's surgery.

Appointments for a period of 6 months. Salary will be within the scale £350–£400–£450 p.a., according to experience and posts held, less a deduction of £100 p.a. for full residential emoluments.

Applications should be sent to the Administrators of the respective hospitals. H. A. FROGGATT, Secretary.

11, Holmesdale-gardens, Hastings.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (160 Beds.) Applications invited for following appointments:—

RESIDENT SURGICAL OFFICER (Male). 6 months' appointment. Salary £450 p.a., less £100 p.a. for residential emoluments.

HOUSE SURGEON (Male or Female). 6 months' appointment. Salary £350–£450 p.a., according to previous posts held, less £100 p.a. for residential emoluments.

Applications in writing, stating age, qualifications with dates, and nationality, with copies of 3 testimonials, to be sent immediately, addressed to the undersigned at Pembroke County War Memorial Hospital, Haverfordwest.

A. W. YOUNGS, Secretary,
West Wales Hospital Management Committee.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (140 Beds.) Required, HOUSE PHYSICIAN (first appointment). 6 months' appointment. Salary in accordance with national scale. Full residential emoluments.

Applications are to be sent to—

A. W. YOUNGS, Secretary,
West Wales Hospital Management Committee.
Glangwili, Carmarthen.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) Required, HOUSE OFFICER (medicine), vacant as from 6th February, 1951. Salary at rate of £350 or £400 p.a., less emoluments. Conditions of service applicable to hospital medical and dental staffs (England and Wales).

Applications, with copies of 2 recent testimonials, should be sent to the Secretary, Herefordshire Hospital Management Committee, County Hospital, Hereford.

HALIFAX. ROYAL HALIFAX INFIRMARY. Required, HOUSE SURGEON (Male) to the Ophthalmic and E.N.T. Departments at this busy acute General Hospital. The post includes part-time casualty duty and is recognised for the D.O. and is now vacant.

Applications, stating age, qualifications, and experience, with 3 recent testimonials, to be forwarded to the Secretary.

HALIFAX GENERAL HOSPITAL. Required, Pædiatric HOUSE PHYSICIAN (Male or Female). Salary according to experience.

Applications, enclosing 3 recent testimonials, to be forwarded to the Secretary at the Royal Halifax Infirmary.

HALIFAX GENERAL HOSPITAL. (425 Beds.) Required, HOUSE SURGEON (Male or Female). Salary according to experience.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, to be addressed to the Secretary at the Royal Halifax Infirmary, Halifax.

HILLINGDON HOSPITAL. House Physician (resident), Male, required at Hillingdon Hospital, near Uxbridge, Middlesex, post vacant beginning of March. Tenable for 6 months. Salary according to scale £350–£450 p.a., less a deduction of £100 p.a. for residential emoluments. Whole-time duties under the Medical Director. Appointment recognised for M.D. (London), Branch I.

Applications, stating age, qualifications, nationality, and experience, with copies of not more than 3 recent testimonials, to be made to the Medical Director.

HILLINGDON HOSPITAL. House Physician (resident), Male, required for Pædiatric Unit at Hillingdon Hospital, near Uxbridge, Middlesex, post vacant mid-March. Tenable for 6 months. Salary according to scale £350–£450 p.a., less a deduction of £100 p.a. for residential emoluments. Whole-time duties under the Medical Director. Appointment recognised for D.C.H.

Applications, stating age, qualifications, nationality, and experience, with copies of not more than 3 recent testimonials, to be made to Medical Director of the Hospital.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE PHYSICIAN required to commence duty 22nd February, 1951. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications, together with copies of 3 recent testimonials, should be addressed to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE SURGEON required to commence duties on 22nd February, 1951. Salary in accordance with terms and conditions of service for hospital medical and dental staffs, with full residential emoluments.

Applications, together with copies of 3 recent testimonials, to be addressed as soon as possible to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) HOUSE SURGEON required to commence duties immediately. Salary in accordance with terms and conditions of service for hospital medical and dental staffs, with full residential emoluments.

Applications, together with copies of 3 recent testimonials, to be addressed as soon as possible to—

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Required, HOUSE SURGEON at the Sutton Branch Hospital, vacant February. Recognised for F.R.C.S. Salary £350–£450 p.a., according to the number of posts held. Appointment will be for 6 months, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Required, OPHTHALMIC HOUSE SURGEON for duties at the Hull Royal Infirmary and the Victoria Hospital for Sick Children, vacant February. Recognised for D.O.M.S. Salary £350–£450 p.a., according to the number of posts held. Appointment will be for 6 months, terminable by 1 month's notice either side.

Forms of application from the Administrative Officer, Hull Royal Infirmary.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. HOUSE SURGEON required in the E.N.T. Department at the Hull Royal Infirmary and the Victoria Hospital for Sick Children. Recognised for D.L.O. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice on either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. ORTHOPÆDIC HOUSE SURGEON required, vacant now. National scale and conditions. 6 months' appointment, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Applications invited for following posts:—

(1) SENIOR CASUALTY OFFICER (Senior House Officer grade). £670 p.a.

(2) JUNIOR CASUALTY OFFICER. Salary £350–£450, according to experience.

If resident there will be deduction in each case at rate of £100 p.a. for residential emoluments. One of the posts may have to be non-resident. Appointments for 6 months, terminable at any time by 1 month's notice either side.

Forms of application from the Administrative Officer.

IPSWICH BOROUGH GENERAL HOSPITAL. (301 Beds.) 2 HOUSE SURGEONS required immediately for general surgical duties. National salary scale.

Applications, with full particulars, to JOHN WILLIAMS, Secretary, Ipswich Group Hospital Management Committee at East Suffolk and Ipswich Hospital.

IPSWICH. EAST SUFFOLK AND IPSWICH HOSPITAL. HOUSE SURGEON to General Surgeon required 2nd March, 1951. Post recognised for F.R.C.S. (Eng.). Good scope for keen applicant.

Applications, with full particulars, to JOHN WILLIAMS, Secretary, Ipswich Group Hospital Management Committee, t East Suffolk and Ipswich Hospital, Anglesea-road, Ipswich.

HERTFORD COUNTY HOSPITAL, Hertford, Herts. (171 Beds.) Required, HOUSE SURGEON (Male), first or second post held. Duties to commence 16th February, 1951. 6 months' appointment. Salary at rate of £350–£400 p.a., less £100 p.a. for residential emoluments. R practitioner holding first post may apply.

Applications to the Secretary, Mr. P. G. BROOKS, Hertford Group Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

ISLE OF MAN. NOBLE'S HOSPITAL. Applications invited for post of HOUSE SURGEON (first post) in busy hospital with over 150 Beds and the usual ancillary departments. Post will provide ample and varied experience in pleasant surroundings. Salary £400 p.a., less £100 p.a. for board and lodging. Appointment for 6 months in first instance.

Applications, with copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas.

ISLE OF MAN. NOBLE'S ISLE OF MAN HOSPITAL. Applications invited for post of SENIOR HOUSE SURGEON at above Hospital, which is an acute general hospital with a busy surgical practice and specialist visiting staff. Post will be remunerated at the level appropriate to that of a Junior Registrar under the terms and conditions of service of hospital medical and dental staffs (England and Wales), and would be suitable for a man reading for a higher surgical qualification. Previous hospital experience is, of course, essential.

Applications, giving all relevant particulars, with copies of 2 recent testimonials or names and addresses of 2 referees, should be forwarded to the Secretary, Noble's Isle of Man Hospital, Douglas.

ILFORD. KING GEORGE HOSPITAL. There will be a vacancy for a HOUSE SURGEON at above Hospital on 12th February, 1951. The post will be tenable for 6 months. Salary will be £350 p.a. minimum, and maximum £450, according to experience and qualifications, less emoluments.

Applications, giving full particulars, and accompanied by testimonials, should be sent to the undersigned within 14 days of the appearance of this advertisement.

G. AUSTIN HEPWORTH, Secretary, Ilford and Barking Group Hospital Management Committee.

King George Hospital, Ilford.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required for the Royal Isle of Wight County Hospital, Ryde (but may be required to serve at any Hospital within the Group). Post recognised for F.R.C.S. Vacant immediately. Salary £350, £400, or £450 p.a., according to experience. National terms of service.

Applications, stating age, qualifications, experience, and nationality, to H. FORSHAW, Chief Administrative Officer, Hospital Management Committee, St. Mary's Hospital, Newport, I.W., as soon as possible.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICER (resident) to Department of Psychiatry. The department includes a neurosis centre and observation wards, and conducts an extensive outpatient service. Salary, terms, and conditions of service as approved for hospital medical staff.

Applications (endorsed "Senior House Officer, Psychiatry, W.M.H."), stating age, nationality, qualifications, and experience, with copies of up to 3 recent testimonials, to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, by 6th February, 1951.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House OFFICER (Anæsthetist), second or third post, required in the Department of Anæsthesia. Hospital recognised for purpose of D.A. qualification. Resident or non-resident. Salary, terms, and conditions of service as approved for hospital medical staff.

Applications (endorsed "House Officer, Anæsthetist, W.M.H."), stating age, nationality, qualifications, and experience, with copies of up to 3 recent testimonials, to the Secretary, South West Middlesex Hospital Management Committee, 1, Churchfield-road, Ealing, W.13, closing date 6th February, 1951.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (124 Beds.) MID-WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON, post vacant 24th January, 1951. Salary £350, £400, or £450 p.a., according to experience, less £100 for residential emoluments. Practitioners within 3 months of qualification may apply, when appointment limited to 6 months.

Applications, with copies of recent testimonials, to be sent to the Administrative Officer at the above Hospital.

LEWES. HERITAGE CRAFT SCHOOLS AND HOSPITALS, NORTH CHAILEY, near LEWES, SUSSEX. Applications invited for appointment of RESIDENT SENIOR HOUSE OFFICER, now vacant. The appointment will be for 1 year, subject to 1 calendar month's notice either way. Work mainly orthopædic (operative and plaster work included), in young children up to 16 years. Also includes long-term pædiatric conditions in infants and toddlers and open-air therapy. Experience also in children's orthopædic clinics. Salary £670 p.a., less deduction for residential emoluments, as negotiated by Whitley Council.

Applications, to be sent with names of 3 referees, in the first instance to the Medical Administrator (phone Newick, Sussex, 111 for visit if desired).

JOHN A. WARBURTON, Secretary, Mid Sussex Hospital Management Committee.

KING'S LYNN. WEST NORFOLK AND KING'S LYNN HOSPITAL. (145 Beds.) RESIDENT SURGICAL OFFICER (Junior) at the above Hospital. Appointment for 1 year, renewable for second year. Salary £775–£890 p.a. The terms and conditions of service of hospital medical and dental staffs will apply.

Applications, stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, should be sent to the undersigned not later than 5th February, 1951. Candidates are invited to visit the Hospital by direct arrangement with the Hospital Management Committee Secretary at the West Norfolk and King's Lynn Hospital.

K. V. F. MORTON, Secretary, East Anglian Regional Hospital Board.

117, Chesterton-road, Cambridge.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (NO. 14). CASUALTY OFFICER. There are 2 Casualty Officers sharing the duties of the Casualty Department and acting as House Surgeon to Specialist beds. The present vacancy is for an officer to look after E.N.T., dermatology, and V.D. clinics and beds. Post suitable for candidates from the Services and those wishing to gain experience to enter general practice. Tenure of post 6 months. Salary, &c., in accordance with number of posts previously held and the terms and conditions of service of hospital medical and dental staffs.

Apply immediately to Miss V. WELLS, Assistant Secretary.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (NO. 14).

CASUALTY OFFICER. There are 2 Casualty Officers sharing the duties of the Casualty Department and acting as House Surgeon to Specialist beds. The present vacancy is for an officer to look after ophthalmic, orthopædic, and physical medicine clinics and beds. Post suitable for candidates from the Services and those wishing to gain experience to enter general practice. Appointment to commence immediately. Tenure of post 6 months. Salary, &c., in accordance with the number of posts previously held and the terms and conditions of service of hospital medical staff.

Applications should be made as soon as possible to Miss V. WELLS, Assistant Secretary.

Warneford General Hospital.

LOWESTOFT AND NORTH SUFFOLK HOSPITAL, LOWESTOFT. (99 Beds.) Required, HOUSE PHYSICIAN (Male or Female), post vacant first week March, 1951. 6 months' appointment. Salary £350 p.a., less £100 residential emoluments.

Applications, with details, to Secretary.

LIVERPOOL. SEFTON GENERAL HOSPITAL, Smithdown-road, LIVERPOOL, 15. (1028 Beds—123 Cots.) Applications are invited for the under-mentioned resident appointments vacant at the above-named Hospital on 1st April, 1951 :—

5 HOUSE PHYSICIANS (general).
HOUSE PHYSICIAN (tropical).
2 HOUSE PHYSICIANS (psychiatric).
2 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
HOUSE SURGEON (orthopædic).

The appointments are for 6 months and are open to practitioners within 3 months of qualification who are liable for service under the National Service Acts. The terms and conditions of service will be in accordance with the regulations of the Ministry of Health, the salary being at the rate of £350 p.a. for first post held, £400 p.a. for second post held, and £450 p.a. for third and any subsequent post held. A deduction at rate of £100 p.a. will be made in respect of board and lodging and other services provided.

Applications, on forms to be obtained from the undersigned, to whom they should be returned, to be received not later than Monday, 12th February, 1951.

GARNET CHAPLIN, Secretary, South Liverpool Hospital Management Committee.

LIVERPOOL. SOUTH LIVERPOOL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the under-mentioned appointments which will become vacant on 1st April, 1951.

Liverpool Chest Hospital 68/70, Mount Pleasant, Liverpool, 3 (78 Beds)
RESIDENT HOUSE PHYS'CIAN.
JUNIOR HOUSE PHYSICIAN (re ident or non-resident).
Liverpool Homœopathic Hospital, 42, Hope-street, Liverpool, 3 (54 Beds)
RESIDENT HOUSE PHYSICIAN.
Liverpool Heart Hospital, 34, Oxford-street, Liverpool, 7 (46 Beds)
RESIDENT HOUSE PHYSICIAN (Male). There is a unique opportunity afforded for acquiring specialist knowledge of diseases of the heart.

The appointments are for 6 months and the terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Applications on forms to be obtained from the undersigned, to whom they should be returned to be received not later than 12th February, 1951.

GARNET CHAPLIN, Secretary to the Committee.

Sefton General Hospital, Liverpool, 15.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Required, HOUSE OFFICER for Orthopædic and Fracture Department at the above Hospital. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 residential emoluments.

Applications, stating age, qualifications, and experience, should be forwarded to the undersigned, together with copies of 3 recent testimonials.

R. W. HOWICK, Secretary, Lincoln No. 1 Hospital Management Committee.

County Hospital, Lincoln.

LINCOLN. COUNTY HOSPITAL. (200 Beds.) Required, HOUSE SURGEON at the above Hospital. 6 months' appointment. Salary at the rate of £350–£450 p.a., according to experience, less £100 residential emoluments.

Applications, stating age, qualifications, and experience, should be forwarded to the undersigned, together with copies of 3 recent testimonials.

R. W. HOWICK, Secretary.
Lincoln No. 1 Hospital Management Committee.
County Hospital, Lincoln.

LINCOLN. THE LAWN HOSPITAL for Mental Diseases. (100 Beds.) LINCOLN NO. 2 HOSPITAL MANAGEMENT COMMITTEE. Required, JUNIOR HOSPITAL MEDICAL OFFICER. Salary and terms of service as issued by the Ministry of Health. Commencing salary £700 p.a., rising to £1000 p.a. There is a flatlet available. The appointment is subject to the provisions of the National Health Service (Superannuation) Regulations, 1950.

Applications, with names of 3 referees, should be forwarded as soon as possible to the Medical Superintendent, The Lawn Hospital, Lincoln.

LEEDS REGIONAL HOSPITAL BOARD invite applications for appointment of REGISTRAR in General Surgery to the Board for duties at hospitals in the Wakefield A Hospital Management Committee group, mainly at the Clayton and the General Hospitals, Wakefield. Remuneration in accordance with the terms and conditions of service of hospital medical and dental officers for the time being in operation, and the appointment will be subject to the National Health Service (Superannuation) Regulations, 1950. The appointment will be non-resident and for 1 year in the first instance.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, by not later than 24th February, 1951. Canvassing in any form will disqualify.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the post of ASSISTANT MEDICAL OFFICER (Junior Hospital Medical Officer grade) for duties at the Regional Blood Transfusion Centre, Leeds. The successful candidate will have ample opportunities to acquire a thorough knowledge of the whole range of blood-transfusion work. The appointment will be normally for 3 years and the commencing salary will be at the rate of £700 p.a. The provisions of the National Health Service (Superannuation) Regulations, 1950, and the terms and conditions of service of hospital medical and dental staffs will also apply.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, not later than 17th February, 1951. Canvassing in any form will disqualify.

LEEDS. THE UNITED LEEDS HOSPITAL AND LEEDS REGIONAL HOSPITAL BOARD invite applications for the joint appointment of SENIOR REGISTRAR in Genito-urinary Surgery. The Outpatient and Diagnostic Department is at the Leeds General Infirmary and the Ward Unit is in St. James's Hospital, Leeds. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs, and the provisions of the National Health Service (Superannuation) Regulations, 1950, will also be applicable. The appointment will be for a year in the first instance and may be renewed, subject to satisfactory progress, up to a maximum of 3 years.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, 29/31, Eastgate, Leeds, 2, by not later than 21st February, 1951. Canvassing in any form will disqualify.

LOUTH, LINCS. COUNTY INFIRMARY. (240 Beds.) Required, RESIDENT SURGICAL OFFICER at the above Hospital. Salary and conditions according to the national scale —i.e., £700 p.a.–£50–£1000 p.a.

Applications, giving full details of age, qualifications, and previous experience, together with the names of 2 referees, to be addressed to the Administrative Officer, County Infirmary, Louth.

LOUTH, LINCS. COUNTY INFIRMARY. (240 Beds.) GRIMSBY HOSPITALS MANAGEMENT COMMITTEE. Required, HOUSE OFFICER (medical), post now vacant, at this busy general Hospital. Terms and conditions of service as laid down nationally.

Applications, giving names of 2 referees, to be addressed to the Administrative Officer, County Infirmary, Louth.

LOUTH, LINCS. COUNTY INFIRMARY. (240 Beds.) GRIMSBY HOSPITALS MANAGEMENT COMMITTEE. Required, HOUSE OFFICER (anæsthetics and general duties), post now vacant at this busy General Hospital. The above duties cover gynæcology, maternity, E.N.T., and some orthopædics. Terms and conditions of service as laid down nationally.

Applications, giving names of 2 referees, to be addressed to the Administrative Officer, County Infirmary, Louth.

LYMINGTON AND DISTRICT HOSPITAL, Lymington, HANTS. HOUSE SURGEON required, post vacant 31st January. Tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by Ministry of Health.

Applications, with copies of testimonials, to be submitted as soon as possible, to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

MARGATE. THE GENERAL HOSPITAL. (132 Beds.) ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON. Appointment for a period of 6 months. Salary at rate of £350 p.a., less £100 for residential emoluments. R practitioners within 3 months of qualification may apply.

Applications, stating age, and qualifications, together with copies of 3 recent testimonials should be sent as soon as possible to the Administrator, The General Hospital, Margate.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE, GROUP 13. Applications invited for appointment of 2 HOUSE SURGEONS at the above Hospital, posts vacant March and April, 1951. 6 months' appointment. 1 post recognisable for F.R.C.S. (Eng.). Salaries in accordance with the terms and conditions of hospital medical and dental staffs (England and Wales) at the rate of £350, £400, £450 p.a., according to experience. A deduction at the rate of £100 a year is made in respect of board and lodging and other services provided. R practitioners holding First House Officer posts are invited to apply.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 2 responsible persons to whom reference may be made as to professional ability and character, should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE, GROUP 13. Applications invited for appointment of HOUSE PHYSICIAN, post vacant end of March, 1951. 6 months' appointment. Salary in accordance with the terms and conditions of hospital medical and dental staffs (England and Wales) at the rate of £350, £400, or £450 p.a., according to experience. A deduction at the rate of £100 a year is made in respect of board and lodging and other services provided. R practitioners holding First House Officer posts may apply.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 2 responsible persons to whom reference may be made as to professional ability and character, should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of either :—

(*a*) RECEIVING ROOM OFFICER, post vacant mid-April. Appointment for 12 months. Salary £670 a year, with a deduction of £150 a year for residential emoluments. R practitioners holding Second House Officer posts are invited to apply, *or*

(*b*) CASUALTY OFFICER, post vacant mid-April. Appointment for 6 months. Salary at the rate of £350, £400, or £450 a year, according to the previous posts held. A deduction of £100 a year is made in respect of residential emoluments. R practitioners holding First House Officer posts are invited to apply.

Applications, stating age, nationality, qualifications, and experience, together with the names and addresses of 2 responsible persons to whom reference may be made as to professional ability and character, should be forwarded to the Secretary, Mid-Kent Hospital Management Committee, 103, Tonbridge-road, Maidstone, Kent, as soon as possible.

MAIDSTONE. BARMING HEATH HOSPITAL. 2 Senior HOUSE OFFICERS required immediately for the above Mental Hospital of 2200 Beds. Applications are invited from medical practitioners who have been registered for at least a year. The post will be held normally for a period of 1 year. Salary £670 p.a. Full residential accommodation is available for single officers or for 1 married officer without children. The appointments are subject to the National Health Service superannuation regulations and to the conditions laid down by the Minister of Health.

Applications in writing, giving the names of 2 persons to whom reference can be made, to be sent to the Medical Superintendent, Barming Heath Hospital, Maidstone, within 10 days from the appearance of this advertisement.

MACCLESFIELD HOSPITAL. Infirmary Branch. Required, SENIOR SURGICAL HOUSE OFFICER. The Hospital is staffed by Consultant Surgeons. Salary and conditions of service are in accordance with the Ministry of Health recommendations for hospital medical and dental staffs.

Applications, stating age, nationality, qualifications, and experience, with copies of 3 recent testimonials, should be forwarded immediately to the Secretary, Macclesfield and District Hospital Management Committee, West Park Branch, Prestbury-road, Macclesfield.

MANCHESTER, 8. CRUMPSALL HOSPITAL. (Adult General—1225 Beds.) Applications invited for following appointments :—

(*a*) HOUSE OFFICER (orthopædics), now vacant.

(*b*) HOUSE OFFICER (obstetrics and gynæcology), 2 appointments, one vacant at beginning and the other at the end of March.

The Hospital is recognised for the purpose of the M.R.C.O.G. The appointments are tenable for 6 months, and are in accordance with the terms and conditions of service of hospital medical and dental staffs.

Applications, stating age, nationality, present and previous appointments with dates, along with names and addresses of 2 referees, to be sent as soon as possible to—

A. T. SAMPSON, Secretary to the Committee.
Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for a senior resident post of MEDICAL REGISTRAR, General Medical Division, Bolton and District Hospitals (Bolton Royal Infirmary and Townleys Hospital, Bolton). The appointee will be required to reside at Townleys General Hospital, Bolton (500 Beds). The appointment will be made in the first instance for 1 year at a salary of £775 p.a. and will be subject to renewal for a second year at the discretion of the Board. A higher qualification is desirable. Applicants must have been qualified at least 2 years. National terms and conditions of service applicable and the post superannuable.

Forms of application can be obtained from the Senior Administrative Medical Officer, No. 1, North Parade, Parsonage-gardens, Manchester, and should be returned, together with the names and addresses of 3 referees, to be received not later than 12th February, 1951. Canvassing will disqualify.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. 2 SENIOR SURGICAL HOUSE OFFICERS, whole-time surgical training posts, vacant on 1st and 10th April, 1951. Duties include those of Orthopædic Casualty Officer, Outpatient Junior Surgical Registrar, Senior House Officer to a Surgical Unit, and Resident Surgical Officer at Barnes Hospital. Salary at rate of £670 p.a. non-resident, with a deduction of £100 p.a. if resident. The appointments are for 6 months, renewable for a second 6 months.

Applications to be made on forms obtainable from the undersigned, and to be returned not later than 10th February, 1951.

F. J. CABLE, Secretary to the Board of Governors.

MANSFIELD. HARLOW WOOD ORTHOPÆDIC HOSPITAL, near MANSFIELD, NOTTS. (340 Beds.) Required, RESIDENT HOUSE SURGEON (second or subsequent post). Salary in accordance with National Health Service scale.

Applications, stating age, qualifications, experience, and enclosing copies of 2 recent testimonials, to be sent to Secretary.

MARKET DRAYTON. CHESHIRE JOINT SANA-TORIUM, near MARKET DRAYTON, SALOP. (305 Beds.) Required, HOUSE OFFICER (T.B.). Salary within the National Health Service scale, according to experience—i.e., £350–£450 p.a., less £100 p.a. residential emoluments.

Applications, stating age, nationality, and full details of previous service, including national service, should be addressed to the Medical Superintendent at the Sanatorium and forwarded without delay. THORNBURROW GIBSON, Secretary,

Stoke-on-Trent Hospital Management Committee.

NEWCASTLE GENERAL HOSPITAL. (959 Beds.) Applications invited from Male registered medical practitioners for the second post of RESIDENT CASUALTY OFFICER for a period of 6 months commencing on 1st February, 1951. Salary according to the terms and conditions for Resident House Officers.

Applications, stating age and experience, together with copies of 2 testimonials or the names of 2 referees, to be forwarded immediately to the Medical Superintendent, Newcastle General Hospital, 418, Westgate-road, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL. (959 Beds.) Applications invited for post of HOUSE SURGEON (urological) to the Department of Urology (46 Beds), vacant on 1st February, 1951, to be held for a period of 6 months. Salary in accordance with the terms and conditions of the National Health Service.

Applications, stating age, qualifications, and experience, together with 1 copy of 2 testimonials, or the names of 2 referees, to be sent to the Medical Superintendent, Newcastle General Hospital, 418, Westgate-road, Newcastle upon Tyne, 4, immediately.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN to the Professorial Psychiatric Unit. The Unit is under the clinical direction of the Department of Psychological Medicine, King's College, Medical School, University of Durham. The appointment is tenable for 6 months and becomes vacant on the 1st February, 1951. Practitioners who have held a previous house appointment in general medicine or surgery may apply. Salary according to terms and conditions of service issued by the Ministry of Health.

Applications, together with 1 copy of 2 testimonials, should be sent as soon as possible to the Medical Superintendent, Newcastle General Hospital, 418, Westgate-road, Newcastle upon Tyne, 4.

NEWCASTLE UPON TYNE REGIONAL HOSPITAL BOARD. REGIONAL THORACIC SURGICAL SERVICE. SENIOR REGISTRAR THORACIC SURGEON (resident) required for duties at the Regional Centre (160 Beds) at Shotley Bridge General Hospital, where the work is almost entirely non-tuberculous (cardiovascular, œsophageal, and pulmonary), and at the associated sanatoria. The appointment is intended for a trainee in thoracic surgery and applicants should hold a higher surgical qualification, and have had a thorough training in general surgery as well as some preliminary experience in chest surgery. Salary and conditions will be in accordance with the regulations and the appointment will be subject to review after 1 year.

Applications, stating age, sex, nationality, qualifications, and experience, together with copies of 1–3 testimonials and/or the names and addresses of 1–3 referees, should be sent to the Senior Administrative Medical Officer, Newcastle upon Tyne Regional Hospital Board, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days. Canvassing of members of the appointments committee will disqualify, but candidates are entitled to visit the unit by arrangement with the Senior Surgeon, Thoracic Unit, Shotley Bridge Hospital.

NEWMARKET. WHITE LODGE HOSPITAL. Applications invited for the following appointments :—

HOUSE PHYSICIAN, post vacant 12th March, 1951.

HOUSE PHYSICIAN, post vacant 20th March, 1951.

Duties include care of general medical and tuberculosis patients, with some anæsthetic work under the supervision of the Specialist in Anæsthetics. Posts are resident and available for 6 months. Salaries in accordance with the national scale.

Applications, with copies of 3 recent testimonials, should be made to the Medical Superintendent.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. NOTTINGHAM NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Required, SENIOR HOUSE OFFICER to undertake work at the above Infirmary. Also HOUSE SURGEON. Salary and conditions of service for these posts are in accordance with the published conditions of the Ministry of Health. The post of House Surgeon is recognised for the D.O.M.S. Examination. Both posts are vacant on 1st March.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent as soon as possible to HENRY M. STANLEY, Secretary, General Hospital, Nottingham. (Nottingham No. 1 Hospital Management Committee.)

NOTTINGHAM GENERAL HOSPITAL. Required, HOUSE PHYSICIAN (Male or Female) for the above Hospital. Duties to commence about 15th March. Salary and conditions of service in accordance with the published conditions of the Ministry of Health, less £100 p.a. for emoluments. If held by an R practitioner the appointment will be for a period of 6 months.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,

Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, SENIOR HOUSE OFFICER (medical) for the above Hospital. Duties to commence as soon as possible. Salary £670 p.a., and conditions of service in accordance with the published conditions of the Ministry of Health.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,

Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, HOUSE SURGEON (Male), duties to commence as soon as possible. Applicants should be interested in urology. Salary and conditions of service in accordance with the published conditions of the National Health Service. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for 6 months.

Applications, stating age, qualifications, and experience, with copies of testimonials, to be sent as soon as possible to—

HENRY M. STANLEY, Secretary,

Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, JUNIOR CASUALTY OFFICER (first post), Male or Female, for the above Hospital. Duties to commence as soon as possible. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, and nationality, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,

Nottingham No. 1 Hospital Management Committee.

NOTTINGHAM GENERAL HOSPITAL. Required, CASUALTY OFFICER. Duties to commence immediately. Salary £350–£450 p.a., according to experience, less £100 emoluments. If held by a practitioner who is liable under the National Service Acts, the appointment will be for 6 months, otherwise renewable. Terms and conditions of service as laid down by Ministry Regulations.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY,

Nottingham No. 1 Hospital Management Committee.

General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Required, HOUSE SURGEON (first post), Male or Female, for the above Hospital, duties to commence as soon as possible. Salary and conditions of service in accordance with the published conditions of the Ministry of Health, less £100 p.a. for emoluments. If held by an R practitioner the appointment will be for a period of 6 months.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, Secretary,

Nottingham No. 1 Hospital Management Committee.

NORWICH. NORFOLK AND NORWICH HOSPITAL. (440 Beds.) EAST ANGLIAN REGIONAL HOSPITAL BOARD. REGISTRAR in Anæsthetics at the above Hospital. The salary and terms and conditions of service for hospital medical and dental staffs will apply. Appointment for 1 year, renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, should reach the undersigned not later than 12th February, 1951. Candidates are invited to visit the Hospital by direct arrangement with the Hospital Management Committee Secretary, Mr. F. L. Gatfield, at the Norfolk and Norwich Hospital. K. V. F. MORTON, Secretary.

117, Chesterton-road, Cambridge.

NORTHAMPTON. ST. ANDREW'S HOSPITAL. Applications invited for appointment of SENIOR REGISTRAR. Previous experience in psychiatry and possession of the D.P.M. are essential. The successful candidate will work in the Hospital and at outpatient clinics. Salary £850–£1150 p.a., together with full residential emoluments.

Applications to be addressed to the Medical Superintendent.

POOLE GENERAL HOSPITAL, Poole, Dorset. (184 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE PHYSICIAN, post now vacant. Conditions of service and salary scale in accordance with national agreements, with a deduction of £100 p.a. in respect of full residential emoluments.

Applications to be forwarded to the Secretary of the Hospital.

POOLE GENERAL HOSPITAL, Poole, Dorset. (184 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON, post now vacant. Conditions of service and salary scale in accordance with national agreements, with a deduction of £100 p.a. in respect of full residential emoluments. The Hospital is recognised by the Royal College of Surgeons.

Applications to be forwarded to the Secretary of the Hospital.

POOLE GENERAL HOSPITAL, Poole, Dorset. (184 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. RESIDENT ANÆSTHETIST required, post now vacant. Salary and conditions of service in accordance with the National Health Service scale—£350–£450 p.a., with a deduction of £100 p.a. in respect of full residential emoluments.

Applications should be forwarded to the Secretary of the Hospital.

PONTEFRACT GENERAL INFIRMARY AND THE HYDES HOSPITAL. (92 Beds.) Required, HOUSE SURGEON (first post), Male. 6 months' appointment. Salary at rate of £350 p.a., less £100 for residential emoluments. R practitioners within 3 months of qualification may apply.

Applications should be sent to—

W. BOWRING, Secretary,
Pontefract and Castleford Hospital Management Committee.
Great Northern House, Salter-row, Pontefract.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (115 Beds.) Required, HOUSE OFFICER (medical), post vacant from 1st February. Appointee will work under the directions of the Consultant Physician and the Pædiatrician. Salary £350–£450 p.a., in accordance with the number of previous posts held, less a deduction of £100 p.a. for full residential emoluments.

Apply, with names of 2 persons for reference, to—
17, Cardiff-road, Newport, Mon. T. A. JONES, Secretary.

PONTYPOOL AND DISTRICT HOSPITAL, Pontypool, MON. (115 Beds.) Required, HOUSE OFFICER (surgical), post vacant from 12th February. Salary £350–£450 p.a., in accordance with the number of previous posts held, less a deduction of £100 p.a. for full residential emoluments.

Apply, with the names of 2 persons for reference, to—
17, Cardiff-road, Newport, Mon. T. A. JONES, Secretary.

PRESTON INFECTIOUS DISEASES HOSPITAL. (102 Beds.) HOUSE PHYSICIAN required 1st March. This Hospital has 37 Beds for Pulmonary Tuberculosis and 65 Beds for Infectious Diseases (part in cubicles), and there is a small furnished flat for a married officer if required. Salary range £350–£450, less £100 for residential emoluments.

Applications, with copies of testimonials, to be forwarded to the undersigned at the Royal Infirmary, Preston.

JOHN GIBSON, Secretary,
Preston and Chorley Hospital Management Committee.

PRESTON ROYAL INFIRMARY. (401 Beds.) House PHYSICIAN required 15th February. Duties to be solely under the Consultant Physicians. Post suitable for candidates wishing to study for M.R.C.P. Salary range £350–£450, less £100 for residential emoluments.

Applications, with copies of testimonials, to be forwarded to the undersigned at the Royal Infirmary, Preston.

JOHN GIBSON, Secretary,
Preston and Chorley Hospital Management Committee.

PRESTON. SHAROE GREEN HOSPITAL. (360 Beds.) HOUSE PHYSICIAN required 1st March. Duties to be solely under the Consultant Physicians. Salary range £350–£450, less £100 for residential emoluments.

Applications, with copies of testimonials, to be forwarded to the undersigned at the Royal Infirmary, Preston.

JOHN GIBSON, Secretary,
Preston and Chorley Hospital Management Committee.

RAMSGATE. THE GENERAL HOSPITAL. (101 Beds.) ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEON. Appointment will be for a period of 6 months. Salary at rate of £350 p.a., less £100 for residential emoluments. R practitioners within 3 months of qualification may apply.

Applications, stating age, and qualifications, together with copies of 3 recent testimonials, should be sent as soon as possible to the Administrator, The General Hospital, Ramsgate.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (718 Beds.) Required, HOUSE SURGEON at above Hospital. Resident post tenable for 6 months. Salary, &c., as per Ministry of Health scale for House Officers, less £100 a year for board and lodging, &c.

Applications, stating age, qualifications with dates, present appointment, and experience, with copies of 2 testimonials of recent date or names of 2 referees, should be addressed immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROCHFORD GENERAL HOSPITAL. (572 Beds.) SOUTHEND-ON-SEA HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for the now vacant appointment of RESIDENT HOUSE SURGEON for a period of 6 months. Salary that for House Officer grade according to previous number of appointments held.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials, should be forwarded to the undersigned at the General Hospital, Rochford, Essex, not later than 1st February, 1951.

J. C. FIELD, Secretary.

ROCHFORD GENERAL HOSPITAL. (572 Beds.) Applications invited from registered medical practitioners for appointment of RESIDENT HOUSE MEDICAL OFFICER (House Officer grade). Post vacant 12th February and is suitable for a recently qualified practitioner. Duties principally in connection with hospital admissions. Salary in accordance with number of previous appointments held.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials, to be sent to the undersigned at the General Hospital, Rochford, Essex, not later than 1st February, 1951.

J. C. FIELD, Secretary,
Southend-on-Sea Hospital Management Committee.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications invited from suitably qualified medical practitioners for appointment of RESIDENT ANÆSTHETIST, vacant 8th February, 1951. Salary scale £700–£50–£1000 p.a., less charge for board, lodging, &c. The appointment will be for a period of 3 years in the first instance, renewable for a further 2 years subject to satisfactory service.

Forms of application may be obtained from the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary,
Sheffield No. 1 Hospital Management Committee.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. CHILDREN'S HOSPITAL UNIT. Applications invited from registered medical practitioners for the resident post of ASSISTANT PATHOLOGIST (Senior House Officer) at the above Hospital. Remuneration will be at the rate of £670 p.a., and will be subject to a deduction for emoluments (at present £130 p.a.).

Applications, stating age, qualifications, and experience, together with the names of 3 referees, should be forwarded immediately to—

JOSEPH GRIFFITH, Chief Administrative Officer,
The United Sheffield Hospitals.
Central Office, Royal Hospital, Sheffield, 1.

SHEFFIELD. UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Applications invited from registered medical practitioners, Male and Female, for post of ASSISTANT CASUALTY OFFICER now vacant. Salary and conditions of service in accordance with the terms laid down by the Ministry of Health for House Officers.

Applications should be sent forthwith to FRANK HART, Superintendent, Royal Infirmary, Sheffield, 6.

RUGBY. HOSPITAL OF ST. CROSS AND ST. MARY'S HOSPITAL. HOUSE SURGEON (first, second, or subsequent post) required for the Obstetric (50 Beds) and Gynæcological (12 Beds) Departments.

Applications, stating age, qualifications, and experience, together with copy testimonials, to the Assistant Secretary, Hospital of St. Cross, Rugby.

SALISBURY GENERAL HOSPITAL. (Salisbury Infirmary and Odstock Hospital—470 Beds.) Required, RESIDENT HOUSE PHYSICIAN. The appointment is vacant on 6th March, 1951, and is for a period of 6 months. Salary and conditions of service are in accordance with the terms for medical staff in hospitals.

Applications, together with copies of 2 recent testimonials, should be sent to the Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, not later than the 31st January, 1951.

SALISBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for appointment of REGISTRAR in the Department of Pathology for the Salisbury area based on the Salisbury General Infirmary.

Further details and application forms (for which a stamped addressed envelope should be enclosed) may be obtained from, and must be returned to, the Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, within 14 days of the appearance of this advertisement. Canvassing will disqualify, but candidates are not precluded from visiting the Hospital.

SCARBOROUGH HOSPITAL, Yorkshire. (163 Beds.) Applications invited from Male or Female registered medical practitioners for post of RESIDENT HOUSE PHYSICIAN. Salary in accordance with the national scale and the appointment will be for 6 months.

Applications, stating age and qualifications, with testimonials, to be sent to the Secretary.

SHOTLEY BRIDGE GENERAL HOSPITAL. (582 Beds.) NORTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Required, HOUSE SURGEONS (resident) with part share in casualty duties. Salary £350, £400, or £450 a year, according to experience, with a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications, and previous experience, together with copies of 2 recent testimonials, should be submitted to the Secretary, Shotley Bridge General Hospital, Shotley Bridge, co. Durham, as soon as possible.

STOKE-ON-TRENT. BURSLEM HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) Required, SENIOR HOUSE OFFICER (surgical). Post tenable for 12 months. Salary in accordance with national scale—i.e., £670 p.a. gross.

Applications, giving age, nationality, and details of previous service, including national service, should be addressed to the undersigned at Princes-road, Hartshill, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. BURSLEM HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. HOUSE OFFICER (medical) required, post vacant very shortly. Salary in accordance with the National Health Service scale for House Officers.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including national service, as soon as possible to— THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. HAYWOOD HOSPITAL. (96 Beds.) Required, HOUSE OFFICER (surgical), second post. Salary in accordance with national scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including national service, to undersigned at Princes-road, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Applications invited for the following posts:—

SENIOR HOUSE OFFICER (orthopædics), vacant 1st March. Tenable for 12 months and recognised for F.R.C.S.

HOUSE OFFICER (second or third post), medical, vacant 1st March.

HOUSE OFFICER (second or third post), ophthalmics, vacant shortly. Recognised for D.O.M.S. and F.R.C.S.

Applications, stating age, nationality, and full details of previous service, including national service, should be forwarded to the undersigned at Princes-road, Hartshill, Stoke-on-Trent, as soon as possible.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Applications invited for HOUSE OFFICER (gynæcology), Male or Female, second post, vacant very shortly. Salary in accordance with national scale.

Applications, stating age, nationality, and details of previous service including national service, to be addressed to the undersigned at Princes-road, Hartshill, Stoke-on-Trent.

THORNBURROW GIBSON, Secretary.
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (1000 Beds.) Applications invited for HOUSE OFFICER (surgical), Male or Female, now vacant. Post recognised for F.R.C.S. Salary in accordance with National Health Service scale.

Apply, with copy testimonials, stating age, nationality, and full details of previous service, including national service, to the Medical Superintendent at the Hospital.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Required, SENIOR HOUSE OFFICER (pathological). Salary in accordance with National Health Service scale—i.e., £670 p.a., and the post is tenable for 1 year.

Applications, stating age, nationality, and details of previous service, including national service, should be forwarded to the Medical Superintendent at the Hospital as soon as possible.

THORNBURROW GIBSON, Secretary,
Stoke-on-Trent Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY. (240 Beds.) Required, ORTHOPÆDIC HOUSE SURGEON/CASUALTY OFFICER (Male or Female), vacant immediately. Salary £350–£450 p.a., less a deduction of £100 p.a. for residential emoluments.

Applications, stating age, qualifications, nationality, and experience, accompanied by copy testimonials, should be sent to the Secretary, Group 15 Hospital Management Committee, Royal Salop Infirmary, Shrewsbury.

J. P. MALLETT, Secretary.
Royal Salop Infirmary, Shrewsbury, 23rd September, 1950.

SWANSEA HOSPITAL. (403 Beds.) Required, Resident HOUSE SURGEON to the E.N.T. Department at the above Hospital. The salary will be according to the National Health Service scale.

Applications, stating age, qualifications, and experience, should be addressed to—

O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWANSEA HOSPITAL. (403 Beds.) Required, Resident HOUSE SURGEON at the above Hospital. The salary will be according to the National Health Service scale.

Applications, stating age, qualifications, and experience, should be addressed to—

O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWANSEA HOSPITAL. (403 Beds.) Required, Resident HOUSE PHYSICIAN at the above Hospital. The salary will be according to the National Health Service scale.

Applications, stating age, qualifications, and experience, should be addressed to—

O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWANSEA HOSPITAL. (403 Beds.) Required, Resident CASUALTY OFFICER to the above Hospital. Salary will be according to the National Health Service scale—Junior Hospital Medical Officer grade.

Applications, stating age, qualifications, and experience, to be addressed to— O. C. HOWELLS, Secretary
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWANSEA. MORRISTON HOSPITAL. (450 Beds.) Required, RESIDENT HOUSE SURGEON at the above Hospital. The salary will be according to the National Health Service scale.

Applications, stating age, qualifications, and experience, should be addressed to the Medical Superintendent, Morriston Hospital, Swansea. O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.

SWANSEA. MORRISTON HOSPITAL. (450 Beds.) Required, RESIDENT HOUSE PHYSICIAN at the above Hospital. The salary will be according to the National Health Service scale.

Applications, stating age, qualifications, and experience, should be addressed to the Medical Superintendent, Morriston Hospital, Swansea. O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.

SWINDON HOSPITALS. (500 Beds.) Required, House PHYSICIAN in the Acute Medical Unit of 64 Beds at St. Margaret's Hospital. Salary, &c., in accordance with national scale; full residential emoluments. The post will fall vacant on 1st March, 1951.

Applications, stating age, qualifications, and experience, with the names of not more than 3 referees should be sent to the Secretary, Swindon and District Hospital Management Committee, Victoria Hospital, Swindon, as soon as possible.

SOUTHEND-ON-SEA GENERAL HOSPITAL, Prittlewell Chase, SOUTHEND-ON-SEA. HOUSE SURGEON (House Officer grade) required for duties in Special Departments (Eyes and E.N.T.). Salary according to previous appointments held, less deductions for board.

Applications, with details of qualifications, &c., with copies of recent testimonials, to reach undersigned at the Hospital as soon as possible. J. C. FIELD, Secretary.

STAFFORD. STANDON HALL ORTHOPÆDIC HOSPITAL, near ECCLESHALL, STAFFORD. Required, SENIOR HOUSE OFFICER (Male or Female). Salary £670 p.a., less deduction for residential emoluments.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, should be forwarded forthwith to— H. H. JONES, Secretary,
Stafford Hospital Management Committee.
13, Foregate-street, Stafford.

SLOUGH. UPTON HOSPITAL.

CASUALTY OFFICER required immediately.

HOUSE PHYSICIAN required, post vacant 1st March.

Salaries on national scale.

Applications, stating age, qualifications, and nationality, with testimonials, should be sent to the Administrative Officer.

SOUTHAMPTON BOROUGH GENERAL HOSPITAL. HOUSE SURGEON (resident) required immediately. Post tenable for 6 months. Salary £350–£450 p.a., according to number of posts previously held, less £100 p.a. for residential emoluments. Terms and conditions of service as laid down by the Ministry of Health.

Applications, with copies of testimonials, to be submitted as soon as possible to the Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STONEHOUSE, GLOS. STANDISH HOUSE SANATORIUM. (278 Beds.) Required, JUNIOR RESIDENT MEDICAL OFFICER (second or third post), Male or Female, in the above Tuberculosis Sanatorium, post now vacant. Salary is at the rate of £350–£450 p.a., according to posts held, less £100 for residential emoluments which include board, furnished apartments, and laundry.

Applications, together with copies of 3 testimonials, should be addressed to the Secretary, Standish House Hospital Management Committee, at Standish House Sanatorium, Stonehouse, Glos.

ST. ALBANS CITY HOSPITAL. Required, Casualty OFFICER (Male). Appointment for 6 months in the first instance. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales).

Applications should be addressed to the Secretary, Osterhills, Normandy-road, St. Albans.

ST. HELENS HOSPITAL. (183 Beds.) Required, Resident HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications to be forwarded as soon as possible to—

N. RICHARDS, Secretary, St. Helens and
District Hospital Management Committee.
Group Office, County Hospital, Whiston, near Prescot, Lancs.

WATFORD CHEST CLINIC AND SHRODELLS HOSPITAL, WATFORD. Locum Tenens REGISTRAR required for an indefinite period to commence duty on 29th January. Experience of pneumothorax work essential; previous chest clinic experience desirable.

Apply Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford.

WINDSOR. KING EDWARD VII HOSPITAL.

HOUSE SURGEON required, post vacant 1st March. Salary on national scale.

ORTHOPÆDIC AND ACCIDENT SERVICE HOUSE SURGEON required, post vacant 6th March. Salary on national scale. Duties include House Surgeon in general surgery.

Applications, with copies of recent testimonials, stating age, qualifications with dates, and nationality, to be sent to the Administrative Officer.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (326 Beds.) WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON to the Senior Surgeon, vacant 22nd January, 1951. Salary £350, £400, or £450 a year, according to experience, less £100 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (326 Beds.) WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON to the Orthopædic Department, vacant immediately. Salary at the rate of £350, £400, or £450 a year, according to experience, less £100 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WOLVERHAMPTON HOSPITAL MANAGEMENT COMMITTEE, GROUP NO. 16, BIRMINGHAM REGION. Applications invited from registered medical practitioners for following appointments :—

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

HOUSE SURGEON (Fracture and Orthopædic Department), vacant now.
SENIOR HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.
HOUSE SURGEON (Ear, Throat and Nose Department), vacant now.
SENIOR HOUSE OFFICER (Ear, Throat and Nose Department), vacant 1st February, 1951.
HOUSE PHYSICIAN (pædiatric). Appointment recognised for D.C.H., vacant shortly.
HOUSE SURGEON (general surgery), vacant now.

New Cross Hospital, Wolverhampton

HOUSE PHYSICIAN, vacant 1st February, 1951.

All appointments subject to terms and conditions of service issued by the Ministry of Health.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.
The Royal Hospital, Wolverhampton.

WHISTON. COUNTY HOSPITAL. (880 Beds.) Required, RESIDENT HOUSE SURGEON. 6 months' appointment. Salary £350–£450 p.a., according to experience, less £100 p.a. for residential emoluments.

Applications to be forwarded to the undersigned as soon as possible. N. RICHARDS, Secretary, St. Helens and District Hospital Management Committee.

Group Office, County Hospital, Whiston, near Prescot, Lancs.

WAKEFIELD. CLAYTON HOSPITAL. (200 Beds.) Required, RESIDENT HOUSE PHYSICIAN at the above Hospital. Salary and conditions of service in accordance with national scale and recommendations.

Applications, giving full particulars, together with the names of 3 referees, should be addressed to—

W. READ, Secretary, Hospital Management Committee No. 9, Wakefield A Group.

WREXHAM. MAELOR GENERAL HOSPITAL. (513 Beds.) Required, HOUSE SURGEON at the above Hospital, to commence in March, 1951. The appointment is recognised for the Diploma of F.R.C.S. (England and Edinburgh). Salary will be at rate of £350, £400, or £450 p.a., according to experience, less £100 p.a. for full residential emoluments.

Applications, stating age, nationality, qualifications, and experience, together with copies of 2 recent testimonials, should be addressed to—

WILLIAM JONES, Secretary, Wrexham, Powys and Mawddach Hospital Management Committee. Maelor General Hospital, Croesnewydd-road, Wrexham.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the following posts :—

County Hospital, York (General Hospital of 269 Beds with full Consultant staff)

CASUALTY OFFICER (with charge of Orthopædic Beds). The post is graded Junior Hospital Medical Officer, £700–£50–£1000, and is vacant immediately. Residential accommodation is available but special arrangements can be made if the applicant wishes to be non-resident or partly resident. The deduction for full residence will be £153 p.a. but otherwise will be reduced or dispensed with entirely.

City Hospital, York (Modern General Hospital of 265 Beds with full Consultant staff)

RESIDENT HOUSE PHYSICIAN. Post is vacant from 18th February, 1951, for period of 6 months. Salary £350 for first post held, £400 for second post, £450 for third post, less £100 for residence.

Applications, giving details of age, nationality, experience, and qualifications, together with the names of 2 referees, to be forwarded immediately to—

FRANK A. MILNES, F.H.A., A.L.A.A., Secretary.

Bootham Park, York.

CHANNEL ISLANDS, STATES OF JERSEY, GENERAL HOSPITAL. Applications are invited for post of RESIDENT MEDICAL OFFICER. Salary £350 p.a., less £100 emoluments, appointment will be made for 6 months but is renewable.

Please apply the President, Public Health Committee, General Hospital, Jersey.

CHANNEL ISLANDS, STATES OF JERSEY, GENERAL HOSPITAL. Applications are invited for post of CASUALTY OFFICER AND ANÆSTHETIST. Salary £350 p.a., less £100 emoluments, appointment will be made for 6 months but is renewable.

Please apply the President, Public Health Committee, General Hospital, Jersey.

NEW JERSEY. ST. ELIZABETH HOSPITAL, 204, South Broad-street, ELIZABETH 2, N.J. Large Hospital, 275 Beds, general rotating service of 1 year ward and private in all branches of medicine and surgery, including the specialties and contagious pavilion. Metropolitan area of New Jersey, 15 miles from New York City, grade A applicants from grade A schools ; frequent clinical conferences ; weekly seminar ; excellent medical and surgical library ; salary $100 per month,, with full maintenance.

Apply to Chairman, Intern Committee, St. Elizabeth Hospital, Elizabeth, New Jersey.

NEW YORK. ALBANY HOSPITAL, Albany, New York. (Affiliated with Albany Medical College.) Available at above Hospital beginning 1st July, 1951, the following positions : 2-year ROTATING INTERNSHIPS, SURGICAL INTERNSHIPS, and 3-year RESIDENCIES in General Practice.

For further information write : J. K. MENEELY, Jr., M.D., Assistant Dean, Albany Medical College, Albany, 1, N.Y.

NEW YORK. UNITED HOSPITAL, Port Chester, New YORK, U.S.A., 200 Beds fully approved, general hospital, offers 1-year rotating INTERNSHIP to graduates of approved medical schools, period beginning 1st July, 1951. Stipend $100 monthly, plus full maintenance.

Address application to Superintendent, United Hospital, 406 Boston Post-road, Port Chester, New York, U.S.A.

NEW ZEALAND. WELLINGTON HOSPITAL BOARD, WELLINGTON, NEW ZEALAND. Applications invited from medical practitioners either registered or eligible for registration in New Zealand for the position of RESIDENT MEDICAL OFFICER, Silverstream Hospital. Applicants should be interested and, if possible, experienced in geriatrics. Salary scale in accordance with the hospital employment regulations—namely, £NZ.1100 p.a., rising to £NZ.1400 p.a. by annual increments of £NZ.50. Unfurnished house suitable for a married man and family is provided in the hospital grounds. Full particulars of the position are given in a schedule of information, copies of which may be obtained upon application to the High Commissioner for New Zealand, 415, The Strand, London, W.C.2.

Applications, giving full particulars as to age, whether married or single, qualifications, experience, and when available to commence duty, should be forwarded by air mail to reach the undersigned not later than Wednesday, 28th February, 1951. Copies of recent testimonials should also be forwarded.

A. F. WILTON, Acting Secretary.

Public Appointments

CIVIL SERVICE COMMISSIONERS will shortly be filling the post of CHIEF MEDICAL STATISTICIAN in the General Register Office owing to the retirement of Dr. Percy Stocks. Those wishing to be considered must be registered medical practitioners with knowledge of medical statistics and experience appropriate to the post. Salary £1850–£2125.

Full particulars and application forms from Secretary, Civil Service Commission Burlington-gardens, London, W.1. quoting no. 3471. Completed application forms must reach him by 23rd February, 1951.

CIVIL SERVICE COMMISSIONERS invite applications from Men for a permanent post of SUPERINTENDING PHARMACIST under the Air Ministry at the Royal Air Force Medical Equipment Depot, Chessington, Surbiton, Surrey. Candidates must have had considerable commercial experience of pharmaceutical work, and membership of the Pharmaceutical Society is an essential qualification. Graduates in pharmacy will be preferred. Salary scale £570–£25–£720.

Particulars and application forms from the Secretary, Civil Service Commission, Burlington-gardens, London, W.1, quoting number 3468 ; completed application forms must reach him by 22nd February, 1951.

COLONIAL MEDICAL SERVICE. In the larger Colonies MEDICAL OFFICERS are required for general duties, including hospital and district work. These appointments offer great scope for the practice of many branches of medicine and surgery with a considerable measure of independence and personal responsibility. Appointments can be made on a permanent basis with pension (non-contributory) at age of 50 or 55, or on a temporary basis with gratuity. Secondment from the National Health Service can usually be arranged for periods up to 6 years with continuation of superannuation contributions and the payment of a resettlement grant on reversion to the National Health Service. Salaries range from £860 to £1630 a year, the starting salary depending upon age and experience. In most territories in Africa the scale for newly appointed doctors with an approved higher qualification is £1050–£1600 a year, with a higher point of entry according to experience. There are many specialist and administrative posts with salaries above this scale available for officers in the Service on promotion. Free passages are granted in both directions. Income-tax is very low. Tours of service vary from 10 months in Nigeria to 4 years in Kenya. Houses with heavy furniture are provided in most territories at a rent of about 10% of salary. Annual local leave is available and generous home leave is granted after each tour. Study leave on full pay is available for those who wish to acquire higher qualifications. Social and recreational amenities are good. Officers serving in East and Central Africa usually prefer to educate their children within that area, where schooling is available, or in South Africa. The short tours in West Africa enable frequent visits to be made to children being educated at home. Many officers have their children with them in West Africa until they reach school age.

Application forms can be obtained from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1. (Ref. no. 27215/14.)

FACTORY DOCTORS: Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor under the Factories Acts, 1937 and 1948, are vacant. Applications should be sent to the Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of application*
BRAUNTON	DEVON	10TH FEBRUARY, 1951
HATHERLEIGH	DEVON	10TH FEBRUARY, 1951
EGHAM	SURREY	10TH FEBRUARY, 1951

HIS MAJESTY'S COLONIAL SERVICE, British Guiana. SENIOR PHYSICIAN required for Public Hospital, Georgetown (660 Beds). Duties include supervision of the work of all Government Medical Officers attached to the medical wards of the Hospital. Appointment will be on probation for 3 years for permanent and pensionable employment. Salary $(BWI) 6480 (£1350). Consulting practice, but not private practice, is allowed. Free unfurnished quarters are provided in the hospital compound. Free passages are provided on appointment for the officer, his wife and children, not exceeding 5 in all. On leave a free passage is provided for the officer only. Income-tax is at local rates which are very much lower than those in the United Kingdom. The tour of duty is 2–3 years. Leave on full salary is granted at the rate of 5 days for each month of resident service. Candidates must be Members of one of the Royal Colleges of Physicians and must have held resident appointments in general hospitals for at least 2 years. Women candidates may be considered.

Application forms may be obtained on request (quoting reference no. 27215/214) from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, S.W.1.

HIS MAJESTY'S COLONIAL SERVICE, Sierra Leone. Vacancies exist for MEDICAL OFFICERS OF HEALTH (Male), and for a Lady MEDICAL OFFICER for obstetrical and child-welfare duties. Appointments will be on 3 years' probation for permanent and pensionable employment, or on short-service contract if preferred. Salary scale including pensionable expatriation allowance, is from £890–£1600 a year. War service and experience will determine point of entry into salary scale. A cost of living allowance is also paid ; Government quarters are normally available at low rental. Free passages for Officers and wives on appointment and on leave. Income-tax at low rates. Tour of service is 18 months. Generous home leave. For the public-health posts a D.P.H. is desirable.

Application forms may be obtained on request (quoting reference no. 27215/236/7) from the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1.

ISLE OF ELY COUNTY COUNCIL. Applications are invited from duly registered medical practitioners for the appointments of 2 ASSISTANT COUNTY MEDICAL OFFICERS OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICERS. The persons appointed will be required to carry out, under the direction of the County Medical Officer, duties in connection with the maternity and child welfare and school health schemes, together with such other duties as may be prescribed. Candidates should hold the D.P.H., C.P.H., or D.C.H., and have had experience in the ascertainment of educationally subnormal children. The salary scale is £850, by annual increments of £50 to £1150, the commencing salary to be determined according to qualifications and experience. Travelling and subsistence allowances will be payable on the Council's scale. The successful candidate will be required to pass a medical examination and the appointment is superannuable.

Applications, together with the names of 3 persons to whom reference may be made, should be made on forms to be obtained from the County Medical Officer, County Hall, March, to whom they must be returned within 2 weeks of this advertisement.

R. F. G. THURLOW, Clerk of the County Council.

County Hall, March, 13th January, 1951.

KENT EDUCATION COMMITTEE. Applications are invited for the appointment of ASSISTANT COUNTY MEDICAL OFFICER (Male) in South West Kent. The salary scale is £850 a year, with annual increments of £50 to £1150 a year. The commencing salary will be fixed at a point on the scale according to the experience and qualifications of the successful candidate. The appointment is superannuable, and the successful candidate will be required to pass a medical examination. The duties are mainly in the School Health and Child Welfare Services and experience in the classification of educationally subnormal children and in the examination of mental defectives will be an advantage.

Applications, stating age, qualifications, and experience, accompanied by the names and addresses of 2 persons to whom reference may be made as to professional ability and character, should be addressed to the County Medical Officer, County Hall, Maidstone, not later than 8th February, 1951.

A. ELLIOTT, M.D.,
County and School Medical Officer.

County Hall, Maidstone, 10th January, 1951.

MANCHESTER. CITY OF MANCHESTER. Health DEPARTMENT. Applications are invited from registered medical practitioners for the position of ASSISTANT MEDICAL OFFICER OF HEALTH. The duties of the person appointed will be mainly in connection with the schemes for the Immunisation and Vaccination Services of the Health Department. The salary scale for the post is £735 p.a., rising by annual increments of £25 to £935 p.a., plus a temporary bonus of £65 p.a., but the actual commencing salary may be fixed within the scale according to the successful candidate's experience.

Forms of application may be obtained from the Town Clerk, Town Hall, Manchester, 2, to whom completed applications should be addressed, so as to be received not later than the 10th February, 1951, endorsed "Assistant Medical Officer of Health." Canvassing in any form is prohibited.

PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2, 16th January, 1951.

PRISON SERVICE. Medical Officer (Male), part-time, required at H.M. Prison, Gloucester, at the end of March. Candidates must be fully qualified medical practitioners and should preferably have some psychiatric experience but this is not essential. Medical duties involve the physical and mental welfare of prisoners and inmates. Salary £400 p.a., subject to review later.

Application forms from the Establishment Officer (E.70/5/25), Prison Commission, Horseferry House, Dean Ryle-street, London, S.W.1.

STIRLING. ROYAL BURGH OF STIRLING. Applications are invited from registered medical practitioners, who hold the Diploma of Public Health, for the whole-time appointment of MEDICAL OFFICER OF HEALTH for the Royal Burgh of Stirling (pop. 28,500). Applicants should be under 45 years of age, unless they have a transfer value for superannuation purposes. The salary will be fixed in accordance with the scale laid down by the Industrial Court. A car allowance will be paid. The appointment will be terminable on 3 months' notice on either side.

Conditions of appointment may be had from the undersigned, with whom applications, stating full details of training and experience, together with copies of 3 recent testimonials, should be lodged not later than Monday, 26th February, 1951.

CHARLES W. NORMAN, Town Clerk.

Stirling, 17th January, 1951.

WARWICKSHIRE COUNTY COUNCIL. County Medical OFFICER OF HEALTH'S DEPARTMENT. Applications are invited from Male registered medical practitioners for 2 permanent appointments of ASSISTANT COUNTY MEDICAL OFFICERS OF HEALTH. Preference will be given to those holding D.P.H. or D.C.H. and with previous experience. Salary according to experience within the following special County scale: £900–annual increments of £50–£1250, with bonus consolidated. The posts are superannuable and appointment is subject to the production of a satisfactory medical certificate. Each successful candidate will be required to provide and use a motor-car in the performance of his duties for which a mileage allowance is payable.

Further particulars (including details of areas) and application forms may be obtained from the County Medical Officer of Health, Shire Hall, Warwick. Closing date for applications is 5th February, 1951.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick, 10th January, 1951.

NORTHAMPTON. COUNTY BOROUGH OF NORTH-AMPTON. ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER. Salary £735–£25–£935 p.a.

Particulars of the above appointment and forms of application, which should be returned by 14th February, 1951, may be obtained from the Medical Officer of Health, 7A, St. Giles'-square, Northampton. C. E. VIVIAN ROWE, Town Clerk.

General Practice

For an Executive Council post apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

TOTTENHAM AND EDMONTON. Applications invited for VACANCY. List at present approximately 3700. Residence and surgery not available. Apply on E.C.16A before 3rd February, 1951, to—

F. J. ASHFORD, Clerk, Middlesex Executive Council.

Gloucester House, Gloucester-gate, N.W.1.

BUDE, CORNWALL. Applications invited for urban-rural VACANCY. Number on list on 1st January, 1951, was 1488. Residence and surgery accommodation available for purchase on negotiation. Apply on Form E.C.16A to the undersigned not later than 7th February, 1951.

F. A. PENROSE,
Clerk of the Executive Council for Cornwall.

11, St. George's-road, Truro.

DAGENHAM, ESSEX. Applications invited for 2 VACANCIES at Dagenham (urban). Not retirement or death vacancies. No list of patients in either case. Accommodation available. Apply on Form E.C.16A before 3rd February, 1951, to W. A. CHAPMAN, Clerk, Essex Executive Council.

131/3, Fillebrook-road, Leytonstone, E.11.

Hospital Services : Non-Medical Appointments

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications invited for post of SENIOR HOSPITAL PHYSICIST at the Radiotherapy Centre, Queen Elizabeth Hospital. Candidates must possess an Honours Degree in Physics, and have had experience in Hospital Physics; preference will be given to research experience in electronic physics, since research facilities are provided. The salary is the subject of negotiation through the Whitley Council, and pending the outcome, the commencing salary will be £750 p.a.

Applications, together with 2 recent testimonials, and the names of 2 persons to whom reference can be made, should be sent to the Secretary, United Birmingham Hospitals, The Queen Elizabeth Hospital, Birmingham, 15, within 14 days of the appearance of this advertisement.

Miscellaneous

British Medical Association. The Council of the British Medical Association invites applications from registered medical practitioners for the appointment of Assistant Secretary. The salary for the post will be on the scale of £1500, rising by annual increments of £100 to £2200 a year. The Association's superannuation scheme will apply to the post. The appointment will be terminable by 6 months' notice on either side.

There is no special form of application, and applications, with full particulars of qualifications, experience, age, &c., together with the names and addresses of 3 persons to whom reference may be made, should be sent to the Secretary of the Association, B.M.A. House, Tavistock-square, London, W.C.1, to arrive not later than 14th February, 1951.

Temporary Assistant Medical Officer, age 25-35, required by large Oil Refinery in North West England. Appointment may become permanent at end of 1 year when candidate must be prepared to serve anywhere if required. Salary on B.M.A. scale and according to experience. State age, qualifications, experience, &c., and give names of 3 referees or copies of 3 recent testimonials.—Reply as soon as possible to: Address, No. 503, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Small but well-established Manufacturing Chemists require a qualified Medical Man with Pharmaceutical experience to initiate research into clinical and technical development. Good salary commensurate with experience. Pension.—Address, No. 507, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Experienced Woman Doctor seeks change. Interested pædiatrics and rheumatology. Partnership, Assistant with view to, or other post.—Address, No. 504, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Secretary (age 32 years) to Consultant available for position in London. 7 years' wide experience in medical profession. Book-keeping, shorthand, typing, and nurse-attendant. Comprehensive knowledge of medical terminology and medico-legal work.—Address, No. 508, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Harley-street Area. Self-contained 6-roomed Flat. Fittings and furniture available.—Address, No. 505, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141) who are specialists in this kind of work.

"Pregnancy Diagnosis by the Xenopus Method." 24-hour service.—Send specimen of urine and £1 1s. fee to: M.O. LABORATORIES LTD., 24, Welbeck-way, London, W.1.

Microscopes. Second-hand Bargains, guaranteed sound order. Write for List. Deferred terms if required.—WALLACE HEATON LTD., 127, New Bond-street, W.1 (MAYfair 6511).

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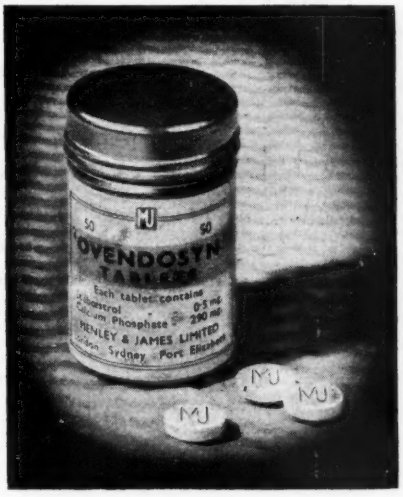

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